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THE MEN OF THE BARMA-GRANDE

(BAOUSSÉ-ROUSSÉ)

AN ACCOUNT OF THE OBJECTS COLLECTED

IN THE

MUSEUM PRÆHISTORICUM

Founded by Commendator TH. HANBURY

NEAR MENTONE

TRANSLATED FROM THE FRENCH OF

Le Docteur R. VERNEAU

FR. ABBO, PUBLISHER

BAOUSSÉ-ROUSSÉ, NEAR MENTONE

1900

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THE MEN OF THE BARMA-GRANDE

(Baoussé-Roussé)

Today many who visit the sunny slopes of the Riviera make an excursion to the Baoussé-Roussé to view the remains of prehistoric men found in the caves. For the researches, carried on without intermission by M. Abbo since February 1892, resulted in the discovery of five more skeletons which were left on the spot. Many relics of primitive handiwork met with in the proximity of the human bones, or at a lower level, show us what the ancient inhabitants of the Mediterranean coast were capable of doing. But the importance of these finds can only be properly appreciated by a small band of scientific specialists. A few amateurs may derive some profit from their excursions to the Baoussé-Roussé ; but, it must be said, that the majority of tourists who are ungrounded in prehistoric lore go away without any perceptible increase of knowledge. There was no convenient handbook to explain to them the interest of the objects upon which they gazed. Yet works devoted to the caves of the " Red Rocks " are comparatively numerous ; but they consist of technical memoranda, scattered moreover through a mass of publications which are difficult of access, or of large volumes which would take too long to read. Thus I

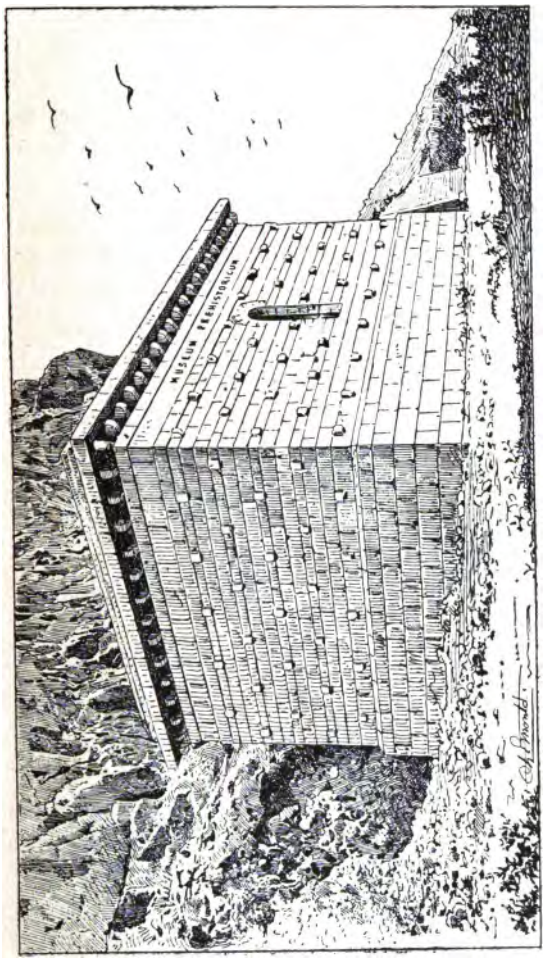

FIG. 1. — The prehistoric Museum at the Baoussé-Roussé.

thought that a small work on the subject would be found useful. The time seemed to me favourable for its publication, as all the objects collected by M. Abbo in the Barma-Grande are shortly to be gathered into a Museum built at the entrance of the cave, where it will be easy to examine them. Thanks indeed to Commendatore Thomas Hanbury of La Mortola a building is now erected a few yards from the cave, and on it may be read : — Museum Præhistoricum. By his instructions all these precious relics will be systematically arranged and exposed to view in this museum (fig. 1).

M^r^ Hanbury has conferred many benefits on the district in which he resides, and being interested in Natural History, Archæology, etc., he could not allow these priceless relics of prehistoric times, which were discovered so near his home, to be scattered abroad. M^r^ Hanbury's beautiful botanic gardens of La Mortola are well known to visitors to the Riviera.

In the near future, no doubt, a catalogue of the contents of this museum will be published. But until this classification is carried out, it would not be possible to write an exhaustive description of all the remains which

the Barma-Grande has yielded. Moreover, before drawing up a systematic catalogue, it might perhaps be as well to write a little book giving a summary of that which is known at the present time about the Baoussé-Roussé in general. I was in some measure prepared to undertake this work, as in February 1892 I was commissioned to make a study of the remains which had then just been discovered, and in March of this year (1899) I made a second journey to the Red Rocks to complete my investigations. I have read nearly everything which has been written on the subject, and I have myself published several memoirs containing the results of my observations.

I thought it might be useful to preface my present work with an introduction containing a sketch of the geological epochs and of prehistoric man, in order to furnish those who care to read the book with the means of thoroughly understanding it. And that I might not waste their time I have condensed, as much as I was able, the information which we possess about the caves of the Red Rocks and especially about the Barma-Grande. Finally with the object of enabling even those who have but little leisure to form an idea of the

interest of the discoveries which have been made, I have concentrated into the few pages which constitute the last chapter the facts mentioned in the preceding chapters. And I have endeavoured to show what conclusions may be deduced from these facts.

Numerous figures will help the reader to understand the text. Nearly all of them have already appeared in "*l'Anthropologie*" and have been kindly placed at my disposal by the editors of that Review. I wish here to express my indebtedness to their courtesy.

I am aware that my little sketch is not free from defects. Many questions yet remain to be elucidated, and I have refrained from creating the impression that they are solved. It seemed to me preferable to draw attention to the lacunæ which exist in our knowledge rather than to attempt to fill these pages with hypotheses.

Paris, August 24, 1899.

INTRODUCTION

I. — Geological Epochs.

If there be at this time a well established fact it is that the earth has not always been as we now know it. Geologists tell us that it was formerly in a molten condition, and that as the result of cooling it gradually became solid on the surface. The earth was swathed in an atmosphere which contained a quantity of aqueous vapour ; this vapour, as it condensed gave rise to very abundant rains which falling on to the terrestrial crust, formed on it an undisturbed sheet of water. At this stage of its evolution our planet showed no inequalities on its surface. But the gases and vapours, which were imprisoned by the solidified crust, upheaved it at certain points and thrust up in the middle of a shoreless ocean first islands then vaster continents. The temperature was at that time too high for life to exist upon the earth ; therefore this period has been called the *azoic epoch* or the age without life.

The temperature became gradually lower and the waters deposited in their depths the substances which they held in solution ; thus layers were formed which are known as *sedimentary deposits*. When the temperature became sufficiently cool, plants and animals of

a very simple organism appeared. This period is known as the *palæozoic epoch* or the age of ancient life.

The temperature continued to decrease; new layers were formed on the surface of the earth's crust which thus increased in thickness from without. While at the same time further solidifying of a portion of the original molten matter increased the thickness of the crust from within. Volcanic forces elevated new lands. In proportion as the conditions of existence were modified, plants and animals of a higher organism made their appearance. During this *secondary* or *mesozoic epoch*, that is age of middle life, reptiles, saurians and batrachians swarmed. Certain reptiles, attained a length of over 25 yards.

The third period has been called the *tertiary epoch*. It is here that the age of recent life begins, or the *cainozoic epoch* which continues to the present day. The temperature was still abnormally high during the tertiary epoch; thus the plants and animals which appeared then belonged to genera represented now-a-days only in tropical regions. Mammals increased in number during this period.

The phenomena resulting from refrigeration became prominent at the fourth period or *quaternary epoch*. Glaciers appeared on the face of the globe and advanced some way towards theq Euator. It is from this extension of the glaciers that this time is often named the *glacial period* or ice age. The formation of sedimentary strata ceased almost entirely; but currents transported materials worn away from land formerly

upheaved and depositing them at a distance gave rise to what is now called *Aluvium*. Simultaneously with these phenomena new species of plants and animals were being added to those which had appeared earlier, or were replacing those which had died out.

Finally the glaciers receded; the earth acquired the features which we see on it today; plants and animals became that which they now are; the *present epoch* succeeded the quaternary epoch, of which it is indeed, in the opinion of some geologists, but the continuation.

The phenomena which I have just sketched took place very slowly and the transition from one period to another is gradual. Thanks to the study of palæontology we have succeeded in establishing the relative ages of the different strata which compose the terrestrial crust. It is quite easy to understand how the plants and animals of earlier times left their remains on the surface of the soil, and how the layers which were formed later have covered over these remains. Therefore the discovery of traces of organic remains in an undisturbed stratum will enable us to ascertain the age of the layer itself. The term *fossil* is applied to the remains of plants and animals which are met with in the layers formed before the commencement of the present epoch.

II. — **The Antiquity of Man.**

Since the most simple living organisms appeared first and were replaced by increasingly complicated

structures, it follows that man, the most complex of all, must have appeared last. To which epoch then should we attribute his development ? This is a question which has, so to speak, presented itself in our day only. People had indeed wondered whether the Biblical creation of Adam and Eve had not been preceded by another creation which had given rise to the gentiles : but these arguments turned on very ambiguous texts. Nevertheless, in presence of the discoveries which were being made, it became impossible not to admit that man existed in ages of which history makes no mention. In the *kjökkenmöddings* or kitchen middens (shell mounds) found in Denmark ; in the *skovmoses* or submerged forests (peat-mosses) of the same country ; in the ancient tombs of Scandinavia ; and among the piles which formerly supported the raised dwellings of the Swiss lakes ; proofs were seen of the existence of races which had lived at a very remote epoch. Little by little the conclusion was reached that, before using iron for the manufacture of his tools, man had had recourse to bronze ; and that at a period of still greater antiquity, when he had been unacquainted with the use of metals, he had provided himself with implements made of stone. Thus the early history of the human race has been divided into three periods : — 1. The Stone Age : 2. The Bronze Age : 3. The Iron Age. Yet, though it had been made possible to prove the existence of prehistoric man, people did not dream of tracing back the appearance of our first ancestors beyond the beginning of our present epoch.

However discoveries, made at the beginning of the XVIII century at Canstadt, have enabled us to ascertain the presence of human remains in a layer which contained the bones of animals now extinct. In 1715 some flints, which had certainly been worked by intelligent beings and which were associated with elephants' remains, were found in a gravel pit in England. But no importance was attached to these finds; and this is not surprising since palæontology, the science dealing with plants and animals which flourished in remote ages, did not then exist.

At the beginning of this century, numerous remains of human workmanship were found mixed with the bones of extinct animals. Yet in spite of this, when Cuvier, the founder of palæontology, died in 1832 this eminent naturalist still doubted the existence of man in periods preceding our own.

Discoveries multiplied rapidly. Among the scientists who did most to advance the study of prehistoric man, may be mentioned Boucher de Perthes, le marquis de Vibraye, Eduard Lartet, Henry Christy and many others. On all sides proofs were found, in the layers formed during the quaternary epoch which had not been disturbed, that man was contemporary with the animals which lived during that epoch. Sometimes these proofs were furnished by weapons or stone implements which could have been made only by our ancestors; or again by carvings or engravings which so faithfully represented the mammals of the glacial period that the artist must have had them

before his eyes; and above all by the remains of man himself, which were collected side by side with the bones of extinct animals. At Eyziers (Dordogne), Messrs Lartet and Christy found a vertebra of a young reindeer pierced by a flint arrowhead which had remained in the bone after having killed the animal; a conclusive proof that man dwelt alongside these reindeer and hunted them. In short the existence of human beings during the quaternary epoch, and even at the beginning of that epoch, is proved by so great an array of facts that no scientist thinks of doubting it.

Did man appear at an earlier age? Did he live in the tertiary epoch which saw so many mammals evolved? This is a question that still gives rise to much controversy. Some authorities see proofs of human existence in certain marks found on the bones of tertiary animals and in certain celts, whose shape they say is the result of human workmanship; while others contend that these marks are due to the teeth of carnivora, and that the celts are not worked or else that they are at least less ancient than they are claimed to be. Though I, personally, am much inclined to believe in the existence of tertiary man, I am bound to admit that the proofs which are brought forward for the support of this theory do not carry conviction to all minds. It is therefore prudent, before deciding definitely, to await more conclusive evidence.

Besides, it may well be possible that the notches in the bones, and the implements which have been

attributed to human beings, were the work of some forerunner of humanity, of some creature intermediate between the large monkeys and man. This hypothesis, which was suggested a long time ago by G. de Mortillet, found but few adherents. But to day the matter has advanced : the man-monkey, or " *l'anthropopithèque* " as the scientist I have just alluded to called it, was discovered in Java by a doctor of the Dutch army, Docteur Eugène Dubois, who named it *pithecanthropus* or the monkey-man, which in fact expresses the same idea as the word " anthropopithèque ".

III. — Subdivisions of the Quaternary Epoch.

The epochs which preceded the present geological period were of immense duration, and in order to study them more easily geologists and palæontologists have established subdivisions. Although the quaternary epoch was shorter than the other periods, it nevertheless extended over a very considerable time, and some authorities have even assigned as many as 200,000 years to it. These figures seem assuredly exaggerated. But it is none the less true that during the quaternary ages the climatic conditions did not remain the same from the beginning to the end, that the species of plants and animals underwent modifications, and that human handicraft developed to such an extent that this improvement could not have been achieved

in a period of less than thousands of centuries. It is therefore evident that when we speak of quaternary man without any further qualification we are using a very vague expression. It is with a view to putting an end to this vagueness that the quaternary epoch has been divided into secondary periods. Eduard Lartet proposed a classification based on the predominance at a given time of some particular animal. In this way he formed the four following divisions:

1. Period of the cave bear.
2. Period of the mammoth & of the tichorhine rhinoceros.
3. Period of the reindeer.
4. Period of the aurochs.

Each of these periods ends when the animal after which it is named ceases to be found in the geological strata. In enumerating them I have placed them in the order of their antiquity.

Lartet's classification has only a purely local value, but it applies fairly well to the South of France.

G. de Mortillet, in his book entitled " Le Préhistorique ", has given a classification which depends chiefly on differences in the workmanship of implements, but which he has felt constrained to place in agreement with geological phenomena and with Palæontology. This arrangement has been so widely accepted that I reproduce the table which is found in his book.

Many objections have been raised to this classification. One, which is incontestible, is that it is adapted entirely to Gaul, and can as yet be considered as provisional only.

In this table the Chelles is the most ancient period, and the Madeleine the most recent.

I may chance, in the course of my work, to borrow expressions at one time from Lartet's and at another from de Mortillet's classification ; I was obliged to give them both in order to be understood by my readers.

Subdivisions of the quaternary epoch, by M. Gabriel de Mortillet

NAME	CLIMATE	GEOLOGICAL FORMATIONS	VEGETABLE PALÆONTOLOGY	ANIMAL PALÆONTOLOGY	HUMAN HANDIWORK
Madeleine.	Cold and dry.	Red diluvium. Atmospheric deposits.	Polar moss in Wurtemburg.	Man of the Laugerie Basse race. Great development of the northern fauna; reindeer, saïga. Disappearance of *Elephas primigenius.*	Drawings & engravings. Bone implements. Disappearance of stone. Many blades. Characteristic graver. Double scraper (gratoir).
Solutré.	Mild temperature.	Relatively of very short duration. Terraces still formed. Glaciers recede.		Man? Horses very abundant. Appearance of *Cervus tarandus, Elephas primigenius.* Rhinoceros disappears.	Appearance, towards the end, of bone implements. Highest development of stone implements. Spear-heads worked on both surfaces & at both ends, & notched. Origin & great development of scrapers.
Moustier.	Cold and damp.	Formation of terraces. Great extension of glaciers. Elevation of the ground.		Man of the Engis & Olmo races. *Ovibos moschatus, Ursus spelæus, Rhinoceros tichorhinus, Elephas primigenius.*	No bone implements. Division of the Chelles implement. Spear heads, scrapers (racloirs) saws, worked on one side only.
Chelles.	Warm and damp.	Fluviatile loam or Lœss. Higher aluvium. Filling up of the valleys. Sinking of the ground.	Plants of the Mediterranean basin in the valley of the Seine & of Canstadt.	Man of the Neanderthal & of the Naulette races. Appearance of stags, Hippopotamus, *Rhinoceros merkii* (pliocene form).	No bone implements. One tool, the Chelles, always of local stone.

IV. — Évolution of Human Handiwork during the Quaternary Epoch.

During the whole of the quaternary epoch man manufactured numerous stone implements of which not one is polished. Later, at the commencement of our present epoch, our ancestors still used stone for a great variety of tools ; but then we find among them a certain number of implements which have been polished by being rubbed against another stone which was used as a " polisher ". So we are obliged to divide the stone age into two periods :

1. Palæolithic or age of chipped stones.
2. Neolithic or age of polished stones.

It is, moreover, necessary to add that during neolithic times a mass of chipped weapons and tools was still made as during the preceding period, but the differences in workmanship enable them to be easily distinguished. When we speak of the chipped stone or palæolithic age we mean the period which corresponds to the whole of the quaternary epoch.

A. — At the beginning of these times man fashioned his implements very crudely. By means of a pebble which he used as a hammer (percuteur) he detached large flakes from a *core* or *nucleus*, and these flakes were very little worked. If the flake was long and thin and sharp edged it was used to tip a wooden *lance* (1).

(1) Other tools less sharp and worked to obtain a fine point have been called *borers* (perçoirs).

Fragments of gritstone, limestone and flint were worked along their edge in such a way as to thin it down ; these became round-ended *scrapers* (racloirs). *Discs*, the use of which is difficult to explain, have been met with in the layers of this epoch. But by far the most characteristic implement is that which has been called the *hatchet* and which ought rather to be considered as a club. This axe is of a peculiar shape, being rather like an almond. It is worked on both surfaces, but always with large flakes, like all the instruments which are found in the same layer. G. de Mortillet thinks that many of these axes were used without handles of any sort, and he has therefore called them *hand axes* (coup de poing). Some of these measure ten inches (25 centimètres). A number were found in the Somme, notably at Saint-Acheul ; later an important deposit was discovered near Paris in the " balastière " of Chelles. It is from the name of these deposits that we derive the terms " acheuléenne " and " chelléenne " which distinguish this first period.

B. — In the next period, the " Moustier ", all the stone implements are still worked with large flakes. Man continued to use the *hammer* (percuteur) ; he still made *blades* (lames), *discs*, round-ended *scrapers* (racloirs) and *borers* (perçoirs), very similar to those of the Acheul period. Certain scrapers show on their edges teeth which have led them to be considered as saws. But the almond-shaped hatchet becomes rare. This club is replaced by a narrow

lance-head which, because of its slender shape, could easily penetrate flesh. Whenever our ancestors may have begun to work stone, they must certainly have obtained at first triangular flakes, with sharp points, which they tied to the ends of sticks. Having discovered the advantages of a weapon of this kind they almost entirely gave up the club of the type of Saint-Acheul, and turned their ingenuity to the manufacture of the deadly lance. And to enable them to penetrate with greater force they often chipped off fine flakes from the edges to make them thinner.

In the Moustier period, man began to use bone splinters and the " stylet " of the horse to make a kind of bodkin (poinçon) or awl (alène). This was done by wearing down one end either by scraping or rubbing.

C. — With time and experience the skill of the stone workers developed remarkably. The *hammers*, *blades*, *lanceheads*, the *scrapers* and the *borers* of the preceding period were still used. These implements show better and better workmanship, but they remain fundamentally the same. At Solutré we see the appearance of a new type of tool; this is the square-ended scraper (grattoir). Imagine an elongated blade of flint with fairly parallel edges one end of which has been chipped so as to obtain a bevil edge shaped convexly, and an idea will be had of the kind of implement. But still more characteristic of the workmanship of the Solutré period is the large lance-head in the shape of a laurel leaf, worked on

both surfaces with a skill which it is not easy to imagine if one has not seen the object. Some are known nearly 12 inches (30 centimètres) in length, with a maximum thickness of 2/5 inch. A few smaller lance-heads (pointes) show quite as much skill ; I am speaking of those which have been worked in such a way as to obtain a notch near the base. The barbs thus formed rendered the weapon very dangerous, for once the spear had entered an animal's body it was fixed by these lateral barbs. Finally, in this period, flint gravers were found, which must have been used to work bone objects (bodkins, whistles, etc.) a considerable number of which have been found at Solutré, and in the execution of the few rough outlines and engravings which have been found there.

D. — At la Madeleine and in the stations of the same period the flint implements are, as a rule, less highly finished than at Solutré : nevertheless they exhibit great skill, remarkable firmness of workmanship and above all a high degree of intelligence. The workman seems to have produced without the least difficulty whatever implement he required. The blades resemble those of the preceding periods : the scraper (grattoir), hitherto rare, becomes very abundant; it is well worked at its wider end. We find saws, borers with the point finely and carefully chipped, and numerous gravers (burins).

Some of these implements were designed for working bone or reindeer horn. This animal abounded in certain districts, and was hunted not only for its

flesh and its skin, but also for the sake of its antlers. These were found most useful for the manufacture of numerous objects such as lance-heads and arrow-heads, cylindric and pointed at one end, or barbed at one or both sides. The shape and number of the barbs are infinitely varied. From reindeer horn these ancient hunters made small curved spindles which they tied by the middle and used as fish-hooks. The same material served for their harpoons. Of bone they fashioned bodkins (poinçons), polishers needles, poignards, etc.

Reindeer horn was not confined to the manufacture of every-day utensils: large pieces of it have been found pierced with one or more holes and ornamented with engravings or carvings. Lartet takes these for staffs of authority (bâtons de commandement): others consider that they were used in harnessing the reindeer, which must have been domesticated if we accept this hypothesis. Phalanges of the reindeer, perforated, go by the name of hunting whistles: notched bone plates pass for tokens or records of the chase (marques de chasse).

The men of this period were artists. They represented by means of engravings and carvings a number of the animals which lived near them, and so faithful were these representations that it is often possible to identify the species. They executed also some small human figures which are, as a rule, remarkable for the excessive development of the posterior parts. But these little figures are far from being

as perfect as the reindeer and other animals which the artist preferred to take as models.

In those districts where the reindeer was scarce, as near the Baoussé-Roussé, the men of this period were deprived of a great resource. Hence they were obliged to supplement the antlers to some extent with stone for the manufacture of lance-or arrow-heads. So that we find a flint lance-head, resembling that of the Moustier type, but worked on the sides and at its point with wonderful care.

V. — Quaternary Man and his Mode of Life.

Even though we are certain of man's existence, from the dawn of the quaternary epoch, we know nothing of his physical characteristics. But we do know that at that time the climate was very mild, and that the *Elephas antiquus*, the *Rhinoceros Merkii*, the Hippopotamus, etc. which have left their bones in the gravel beds of Chelles, were adapted to a hot country. It follows that these primitive men were able to live in the open air or under rough shelters. Feeling no need of clothing they wandered about on plain and plateau, and followed the water-courses, and it is in these last that the greatest number of implements of this period have been found. Man being obliged to defend himself from the fierce animals which surrounded him and having killed them, would certainly use

their flesh for food. And in any case game was not scarce either in the plains or in the rivers. Armed as he then was man ought easily to have provided for his wants.

At the Moustier period the temperature was considerably lower. The mammals of the hot countries had become extinct; and if we find, side by side with the cave bear a rhinoceros (the tichorhine), and an elephant (the mammoth), they were covered with a thick coat which enabled them to resist the cold. Man also was obliged to seek shelter.

Caves, on the banks of rivers hitherto flooded, were exposed as the waters fell, and in these the *troglodyte* took up his abode. He was obliged to clothe himself, and he turned into garments the skins of the animals which he had slain. He prepared the hides with scrapers, and pierced holes in them with bodkins, fastening them together with thongs. He continued to hunt, but the worn condition of his incisors shows that he included in his diet wild plants and roots.

We know the characteristics of the race which then inhabited our lands. Small in stature, with low skull, receding forehead and enormously thick superciliary ridges surmounting great round eyes these individuals were prognathous and had receding chins. They seem, to judge from the shape of the thigh-bone and tibia, to have been in the habit of walking with their legs slightly bent. This race, which is now well known, is called *Canstadt, Nean-*

derthal or *Spy* from the names of the localities where the most interesting remains were found.

This race was succeeded, a little later, by the splendid type of *Cro-Magnon* of the *Baumes-Chaudes*, representatives of which are found at the Baoussé-Roussé and which I will describe at the end of this sketch. As the climate was still cold, they continued to live in caves, and to clothe themselves with skins, fastening the various pieces together with the help of those bone needles I have already mentioned. Being much better equipped than their predecessors, these powerful men cannot have been at a loss for food, more particularly as reindeer, horses and many other animals upon which they fed, congregated in numerous herds in those regions. And the leisure which they enjoyed they used to develope their artistic instincts. It is these men who executed those remarkable carvings and engravings to which I referred above. They showed also a very pronounced taste for ornamental objects, and in order to obtain fine shells, they instituted a system of barter from tribe to tribe. These people probably lived under a real hierarchy and they may have possessed religious beliefs; for certain hanging ornaments have been considered as amulets. At any rate they buried the bodies of their dead with care, and interred them in the same caves which they used as places of shelter.

VI. — Neolithic Man.

The race of Cro-Magnon outlived the quaternary epoch. It survived the transition between that epoch and the present, a period upon which we are beginning to acquire some information, thanks to the researches of M. Abbo. At the commencement of the present epoch these people still dwelt in caves and hunted. But the reindeer had migrated, and they thus lost one of their chief resources. Their handiwork suffered from this and they were obliged to substitute stone for the antlers.

Fresh types of implements were invented, notably a kind of axe (tranchet) which was not polished at its broader extremity but ended nevertheless in a slanting edge. Experience had taught these men to choose the best stones; those which split the most easily and gave the largest flakes. He could distinguish good flint from bad, and he made implements remarkable for their size. Perhaps, in the course of time he even discovered how to polish some of them.

Soon the invaders arrived; some with short heads and broad faces; others with long elliptical heads and narrow faces. They were armed with arrows with barbed flint heads, knew how to polish their stone implements and made coarse pottery. They had domesticated certain animals and cultivated a few plants. These men erected large chambers built of

huge slabs which are called *dolmens*, and in which they buried their dead. They also constructed huts; and it is possible that a few of their predecessors did so too.

War was waged between this new race and the descendants of quaternary man. The invaders, by virtue of their superior industrial capacities, got the upper hand, and some of their adversaries deserted the country and migrated towards the south. Yet a good number remained in the home of their ancestors, and when peace was concluded intermarriage took place and the two races amalgamated. The Cro-Magnons adopted the industrial habits of their conquerors, began to polish their axes, chisels and a few other tools, made pottery, domesticated animals, cultivated plants and constructed dolmens. At this time stone workmanship reached a high state of perfection; the implements which had not been polished were carefully re-worked ; innumerable minute chips were removed, no doubt by pressure, from blades, lance or arrow-heads, poignards, etc, and thus very regular shapes were obtained. These neolithic implements possess a distinct character of their own which enables them to be easily distinguished from palæolithic tools.

Such then are the facts, condensed as much as possible, which the researches of modern times have brought to light about the Stone Age. In this brief sketch I have passed over many questions which are by no means devoid of interest : but I was

obliged to limit myself to generalities lest I should take up too much space. I trust that this introduction, in spite of its omissions, will enable the reader who has no archæological knowledge to understand without much trouble the following pages which are devoted to the Barma-Grande.

CHAPTER I

The Caves of the Baoussé-Roussé

I. — Situation.

In passing from Mentone along the coast into Italy, a great mass of rock will be noticed about 200 yards beyond the frontier. Because of its colour it is called in the Mentone dialect, *Baoussé-Roussé*, that is Red Rocks. (In Italian *Balzi Rossi*.) The Corniche Road, leading to Genoa, passes above this rocky mass, which, on the side facing the sea now ends abruptly, because for many years the stone was quarried for building material. Today a small plateau about 30 yards wide exists between the foot of the rocks and the sea.

Formerly the configuration of the cliffs was rather different. On the southern side they stretched down almost to the water's edge, being separated from it only by a Roman road, the *Via Aureliana*, of which traces still remain. Then also its slope was less steep.

It is not only to the south that this block has been cut away : it has been tunnelled from west to east by the railway which runs from Marseilles to Rome and Naples (fig 2).

The Red Rocks contain many large caves, all open-

ing to the south. As far back as 1786 de Saussure had studied their formation. But they were to remain half a century longer before attracting any special attention. It was in 1846 that Florestan I, Prince of Monaco, thought of examining them. A few years later his example was followed by M. Antonio Grand of Lyons, who from 1854 to 1858 made investigations every winter in the caves. Then followed Messrs Forel (1858), Dr Pérès and Ph. Gény (1858), Moggridge (1862 to 1871), Ernest Chantre (1864), Paul Broca (1865), Costa de Beauregard (1868), Em. Rivière (1870 to 1875). It would be ungracious to omit from this list the name of M. L. Julien, and that of M. Bonfils formerly "syndic des marins" at Mentone, who during many years turned up the earth of the caves of the Baoussé-Roussé and collected a considerable number of bones and worked tools. Lastly since 1892 M. Abbo has excavated without interruption the most important cave, which is known because of its size as the *Barma-Grande*. And Prince Albert I of Monaco recently commissioned the abbé de Villeneuve to undertake methodical investigations in the seventh cave. His researches have resulted in discoveries of the greatest scientific interest.

The numerous books lately published have made the *Mentone caves* justly famous. They are indeed better known by this name, though situated, as I have said above, on the Italian frontier. In 1846 they still belonged to the Principality of Monaco; but now they are included in the Kingdom of Italy, being

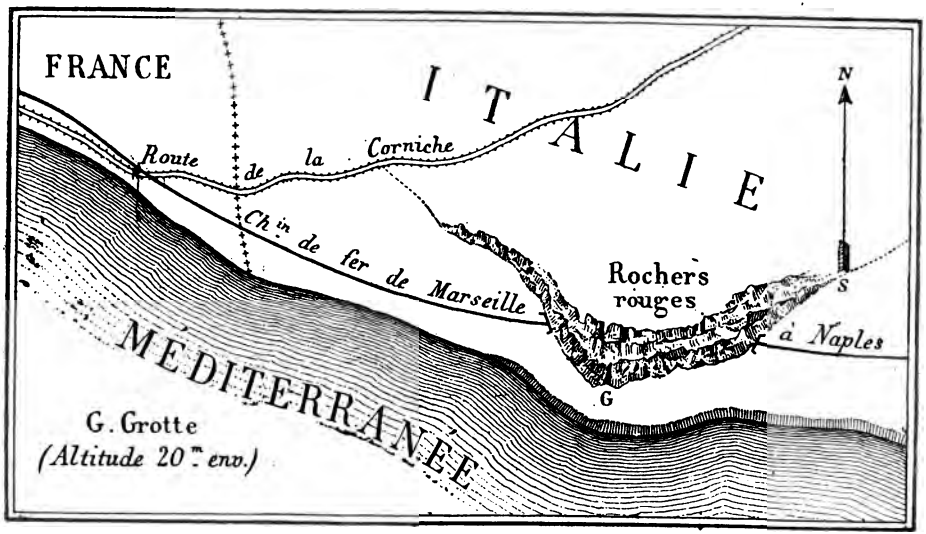

FIG 2. — The Baoussé-Roussé and the Barma-Grande (G).

situated in the " commune " of Ventimiglia below the village of Grimaldi.

It is a delightful walk of about forty minutes from Mentone to the Baoussé-Roussé. Or we may take the tram which runs as far as the Promenade Saint-Louis, and from there the caves are only ten minutes distant. For the last few months they have been made accessible even to carriages, which set down visitors at the " *Restaurant des Grottes* " established by M. Abbo ; while the French and Italian " douaniers " allow traffic to pass freely.

The road skirts the sea and passes by many a lovely garden, charming villa and palatial Hotel.

A semicircle of high hills which, at a distance of three miles from the sea shore, rise to 4,000 feet in Mount Granmondo, shelters from the north wind the whole coast as far as the Red Rocks and beyond. It is easy to understand, after visiting this place why Mentone is so favourite a winter resort, and why our prehistoric ancestors chose this privileged coast for their home. The excavations mentioned above have proved that the caves of the Baoussé-Roussé were used as shelters and burial places at a very remote epoch. And it is the principal results of these researches that I wish to explain in this little book.

II.— General view.

There are nine caverns in the Red Rocks. They are hollowed out of a mass of *nummulitic limestone* — that

is to say a compact calcareous rock which was originally formed at the bottom of the sea. This is proved by the presence in it of thousands of small marine shells called by scientists " nummulites ". The size of the caves is considerable. The largest, the *Barma-Grande* (the fifth from the frontier) still measured in 1892 53 feet in depth and about 13 feet in breadth at the entrance. It narrows to a width of 11 ¼ feet near the middle where at a height of 12 feet from the bottom it is only four feet wide. The height of the cave at its entrance is about 65 feet, and it has not yet been cleared away to the actual bottom. Thirty years ago the cave extended 93 to 100 feet further southwards and its width at the entrance was then 22 feet. This diminution is due to the fact already mentioned that the numulitic limestone being good building material the owner as well as his neighbours have quarried away the south front.

The entrance of the Barma-Grande is about 65 feet above sea level and faces the shore which is to the south, as do all the other caves in the neighbourhood.

When the mass of the Red Rocks emerged from the Mediterranean, the caves were quite empty. But little by little they became partially filled with fragments of rock which had detached themselves from the top or the sides. Various substances penetrated into the cave either by cracks in the rocks, or by the entrance. Ashes and charcoal remaining from fires ligted by the people who took refuge there, and the bones of animals, which for the most part were killed by man

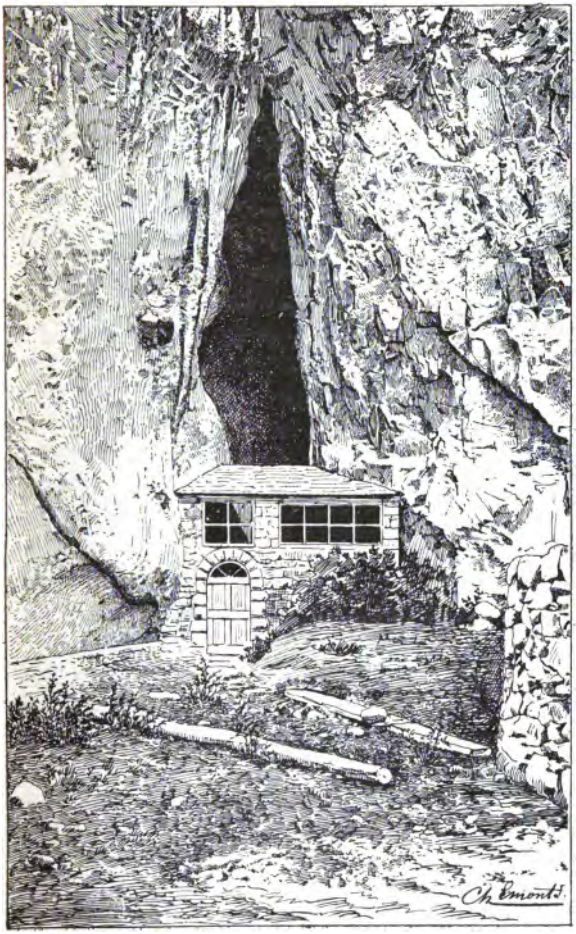

FIG. 3. — The entrance of the Barma-Grande in 1899.

and brought there to be eaten, gradually accumulated. By this means the large cave which originally measured over 65 feet has become filled up to within about 30 feet from its roof. This deposit therefore is more than 33 feet deep. Centuries must have elapsed for the formation of so thick a layer. But at the present time a great deal of this deposit has disappeared; the owner of the cave having removed the fertile earth in order to make a garden near the entrance. It was when digging out this detritus that the interesting discoveries were made which I am about to describe. The level to which the earth formerly reached can still be clearly seen. In 1884, when Messrs Julien and Bonfils of Mentone began their excavations, they were careful to drive nails into the rock to mark the original height of the deposit. Moreover the walls of the cave are of a lighter colour where they were covered by the mould, and the upper portion, having acquired a dark gray tint from exposure to the air, contrasts with this.

As regards antiquity it is obvious that the oldest layers are those which were deposited at the bottom of the cave, and the most recent those which are on the surface. But the soil was disturbed in certain places and holes had been dug at different times so that a partial mixing of the remains ensued. It is evident, for example, that if trenches had been opened to a depth of 5 feet bones and objects which originally lay at a lower level would be brought to the top. And it follows that the articles thus brought up

from a depth would not be contemporary with others which might be found in the undisturbed soil. Therefore it is difficult to determine the exact age of the objects found in the Barma-Grande (and, no doubt, in many other caves) even though the level at which they were discovered is known. But as the earth was disturbed in certain places only and the layers were not turned up to their entire depth, it is possible to establish roughly the age of each of the layers which have been deposited in the caves. Here, as elsewhere it is the bones of animals which will furnish us with the data for our calculations.

I must mention that in the following pages I shall deal almost exclusively with the cave-earth of the Barma-Grande, for we have absolutely no accurate data about the other caves. This statement will no doubt surprise those of my readers who have heard of the numerous works which have been published about the caves of the Red Rocks. Therefore it seems necessary that I should explain briefly the reasons why we are in want of accurate information.

The first investigators gathered together carefully all the remains of animals and of human handiwork they came across ; but they did not think of making notes of the level at which each object was embedded. It is true that most of them dug only in the upper stratum.

M. Rivière seems at first sight to have acted in a different manner. He says that he examined the earth in the fourth cave in the order of the succes-

sive deposits " digging it out little by little and in layers ten inches thick from the entrance to the further end of the cave " (1). But he constantly omits to inform us at what depth he found his objects. Perhaps it seemed to him a matter of little importance, for he early came to the conclusion that the whole deposit had been formed during the quaternary epoch. " The Mentone caves, he says — those in any case which we have explored — belong from the surface of the soil to the bottom to one and the same epoch " (2). Many times he reverts to this fact and he does not appear to have dreamt of establishing any subdivisions. For him all belongs to one period, and in consequence the question of the different levels has not the same interest which archæologists as well as geologists and palæontologists attach to it.

Nevertheless pottery and polished axes were mentioned as having been found in the caves of the Red Rocks, and it was impossible to refer these objects to the quaternary epoch. M. Rivière exerted himself to prove that these discoveries were doubtful and that certain articles had been picked up elsewhere. But he himself found a polished axe broken at both ends. " I found it on the surface of the ground, among a few stones heaped up in one

(1) EM. RIVIÈRE. *De l'antiquité de l'homme dans les Alpes-Maritimes*. Paris, 1887, p. 129.

(2) EM. RIVIÈRE. *Op. cit.*, p. 199.

corner of the third cave where the Italian " douaniers" often sat under shelter to watch for smugglers : for at the time when I first began my excavations smuggling went on daily. And many a time one or other of our caves served these very men as places of refuge at night, while their cracks and crevices were used as hiding places for goods which were to be secretly conveyed across the frontier. Under the circumstances it is impossible for me to determine the true place of origin of this axe " (1). It is probable that neither the " douaniers " nor the smugglers brought it, but that it lay originally in one of the surface strata of the cave. In any case the probability of the existence of a layer as late as the polished stone age, and the certainty of the existence of a thick layer which began to be deposited at the beginning of the quaternary epoch and increased till the end of that epoch, should have induced him to proceed with much care and method.

At the outset the excavations were carried on in the Barma-Grande with the same want of system as elsewhere : for when M. Abbo undertook to empty the cave he had no thought of making a methodical investigation. The surface layers became mixed in his garden with earth from different levels of the deposit which had been removed from the front exposed by blasting. Fortunately the discovery of human skeletons modified in some degree his method

(1) Em. Rivière. *Op. cit.*, p. 300.

of procedure. The whole sale clearance was temporarily checked, and at the present time the cave is far from completely empty. I was thus enabled to make some accurate observations in the lower layers.

III. — **The Elephant layer.**

I have said that the excavations had not yet reached the rocky bottom of the Barma-Grande ; but a layer has been exposed, for an area of a few square yards, which cannot be far from the original bottom. In this stratum M. Abbo has met with bones of animals which have been extinct in our lands for thousands of years ; among them are found a rhinoceros and an elephant. This latter pachyderm has left us a few of his teeth, several isolated bones and an *ilium* to which part of the *femur* was still attached. This fact proves that no disturbance had taken place at this level, and moreover it enables us to assert that the layer in question was formed when the species to which the elephant of the Baoussé-Roussé belonged was still represented in the South of France.

But what was this species ? This is a question which it is most important should be solved, for palæontologists have taught us that various species of Proboscidia existed in France. Many lived during the tertiary epoch, while the last, the *Elephas primigenius* or Mammoth, characterised by its large recurved tusks, did not abandon this land till at an

advanced period of the quaternary epoch. The fur with which he was covered enabled this animal to resist a very low temperature. To this day the remains of the elephant collected by M. Abbo have not been named with certainty. A few palæontologists believe that the bones in question do not belong to the mammoth (1); but we may be sure that they are the remains of a quaternary animal for they are associated with implements very characteristic of that epoch. I will return, in the following chapter, to the objects of human workmanship found in the layer of the Elephant.

However, whether it be the *Elephas primigenius* which was discovered, or some other quaternary species; or whether the rhinoceros is the *tichorhine* with nostrils divided by a bony septum ("cloison") and with a thick coat, a contemporary

(1) In the lower deposits of the seventh cave, the layers of which appear synchronous with those of the Barma-Grande, l'abbé de Villeneuve met with the remains of an elephant which M. Marcellin Boule recognised as belonging to the species known, as *Elephas antiquus*. The magnificent palæontological collection found in this cave in the course of excavations which Prince Albert of Monaco organised, will be described soon with all the care they merit, and this study will most certainly throw great light on the relative ages of the stratified deposits of the Red Rocks. All that we can say at present is that it is probable that the elephant found in the Barma-Grande is the *E. antiquus* like the remains met with by l'abbé de Villeneuve under analogous stratigraphical conditions.

of the mammoth, or some other nearly allied species ; it is certain that the Barma-Grande, like all the other caves of the Red Rocks began to be filled up at the commencement of the quaternary epoch. It is above the stratum of which I have just spoken that we find the layer containing the remains of animals characteristic of the second half of the glacial period and the various objects made by the men of that age.

IV. — **The Reindeer layer.**

A. — *Depth of the stratum.* It is very difficult to estimate at the present time the depth of the deposit which was formed in the cave from the time when the elephant ceased to exist on the Mediterranean shores to the end of the quaternary epoch. The surface layers are said to be of recent formation ; but, I repeat, they were not examined with all the necessary precautions, so that it is impossible to say at what distance from the bottom the ancient deposits cease. In any case we may suppose that they attained considerable thickness ; for the layer deposited during the Reindeer age and lying above that of the Elephant, was far from completely dug out of the cave at the time of my visits to Mentone. It could be traced for more than two yards above the elephant layer and the upper portion had already been removed. Information which I obtained

from people who had worked in the cave led me to suppose that this deposit was originally of greater thickness.

B. — *Mammalia.* M. Abbo collected many bones of animals in this stratum. He was good enough to entrust me with several cases of these specimens, and they were carefully examined by M. le professeur H. Filhol and by M. Marcellin Boule. The recognised competence of these two savants can leave no doubt as to the correctness of their decision. The following is a list of the mammals which they recognised :

1. Fox *(Canis vulpes).*
2. Horse *(Equus caballus).*
3. Boar *(Sus scrofa).*
4. Ox *(Bison europœus?).*
5. Red deer (*Cervus elaphus).*
6. Roebuck (*Cervus capreolus*).
7. Ibex (*Capra ibex*).
8. A ruminant belonging to the genus *ovis* (sheep) or *capra* (goat), represented only by fragments of the jaw containing first teeth.

Remains of the deer are by far the most abundant. The animals, bones of which have been collected, may be divided into two groups. Some are exactly similar to our present deer ; but the others are larger and in this respect they approach rather to the type of the Canadian Stag (*Cervus canadensis*).

In the list of mammals which I have just given, we do not meet with a single species which is clearly

characteristic of the quaternary epoch. It is true that I had requested to be sent those bones only which had been collected in the immediate vicinity of the human skeletons, which will be discussed further on, and I am convinced that these skeletons were buried there at the end of this epoch. There would indeed be nothing surprising in the fact that animals' bones contemporary with the human bodies should have fallen into the troughs hollowed out for the interment of these. It would be necessary to search elsewhere for proofs demonstrating the age of the layer itself.

In the Museum of Mentone there are a few mammals' bones collected long ago by Messrs Julien and Bonfils; these have been identified as belonging to the following species :

1. Horse (*Equus caballus*).
2. Red deer (*Cervus elaphus*).
3. Roebuck (*Cervus capreolus*).
4. Urus or wild bull (*Bos primigenius*).
5. Goat (*Capra primigenia*).

The fourth and fifth species lived during the quaternary epoch. It is extremely likely that they are derived from the layer which we are studying, although we do not possess any information as to the level at which they were discovered.

M. Rivière should have furnished us with accurate details if he conducted his excavations with the great care of which he speaks. But on the contrary we find in his book only vague information. When

he speaks about the animals of the fifth cave or Barma-Grande, he expresses himself in the following words: " As regards the fauna, we found in this cave nearly the same animals as in the first four caves, with perhaps the exception of a larger number of the bones of batrachians. Moreover the bones and teeth of every description, broken and whole, are so abundant that at a certain depth below the first level the earth is almost entirely composed of them " (1). He draws particular attention to the abundance of the Common Boar which he calls *Sus scrofa fossilis*, and of another animal of the order of Suida which is said to be *Sus Polucci*. He also notes near the bottom of the cave an accumulation of the antlers of Cervidæ, lying " in hearths situated at a depth of five feet or lower " (2). The words " at a depth of five feet or lower " are not accurate enough to draw any conclusion from, as the quaternary strata might end at a lower level.

With regard to objects made of bone M. Rivière does not give us any more precise knowledge. Though rare in the upper layers " they were more numerous, (he tells us) after a certain depth " (3). He mentions the bone of a bear cut into the shape of a bodkin, and the rib of an ox which had been used to make a polisher, besides numerous objects of stag's horn or bone. When speaking of the rib of

(1) Em. Rivière. *Op. cit.*, p. 181.
(2) Em. Rivière. *Op. cit.*, p. 182.
(3) Em. Rivière. *Op. cit.*, p. 187.

an ox, he remarks that it is of a mahogany colour like many other articles and especially some of the rhinoceros's teeth. He must therefore have found rhinoceros's teeth. But in order to form an approximate idea of the species of animals of which he discovered remains in the Barma-Grande, it is only necessary to refer to the list of those he met with in the first four caves, since they are " nearly the same ". Here then is the complete list :

1. **Insectivora.**

Hedgehog *(Erinaceus europaeus)*,

2. **Carnivora.**

Cave-bear *(Ursus spelæus)*.
Common bear *(Ursus arctos)*.
Wolf *(Canis lupus)*.
Fox *(Canis vulpes)*.
Weasel *(Mustela vulgaris)*.
Cave-hyena *(Hyœna spelœa)*.
A feline analogous to a panther *(Felis antiqua)*.
Cave-lion *(Felis spelœa)*.
Lynx *(Felis lynx)*.
Wild cat *(Felis catus)*.

3. **Rodentia.**

Marmot *(Arctomyx primigenia)*.
Rat *(Mus tectorum ?)*.
Field mouse *(Mus arvalis)*.

Dormouse *(Mus muscardinus).*
Rabbit *(Lepus cuniculus).*

4. Pachydermata.

Rhinoceros *(R. tichorhinus).*
Horse *(Equus caballus).*
Wild boar *(Sus scrofa fossilis),*

5. Ruminantia.

Urus or Wild bull *(Bos primigenius).*
Elk *(Cervus alces).*
Red deer *(Cervus elaphus).*
Canadian Stag or Wapiti *(Cervus canadensis)*
Corsican Stag *(Cervus corsicanus).*
Roebuck *(Cervus capreolus).*
Chamois *(Antilope rupicapra).*
Goat *(Capra primigenia).*

I have omitted the other vertebrates and also the invertebrates. The list of mammals I have just given contains numerous species which exist today and others which lived at the commencement of the quaternary epoch. It is evident they could not all have been found at the same level, and it is to be regretted that M Rivière did not take the trouble to note at what depth he discovered the remains of each species. His book does not furnish us, any more than do the labels in the Mentone Museum, with information about the layer which is immediately above that of the elephant.

Therefore we may suppose that this stratum dates from the end of the quaternary epoch. But as facts are preferable to the most specious arguments, I do not cease to regret having no accurate records. These records had to be searched for in the bones collected by M. Abbo in the layer which we are considering. Now, last March (1899), when accompanied by my friend M. Boule I visited the Baoussé-Roussé again, my learned colleague saw a fragment of a lower

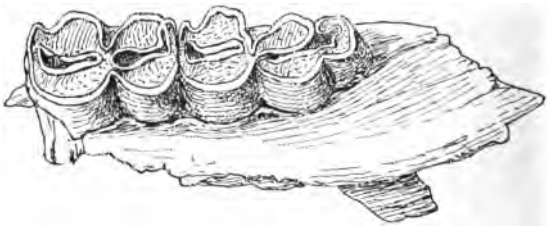

FIG. 4. — Fragment of the lower jaw-bone of a reindeer.

jaw which at once attracted his attention. He recognised the remains immediately as that of a reindeer, and, though he was convinced that he was not mistaken, he asked to have the fragment lent him in order that he might study it more carefully. This examination proved that he had not been wrong in his determination of the specimen, and M. le professeur Gaudry shared his opinion. The animal to which the jaw belonged was an old reindeer, and the two molars still contained in it are much worn (fig. 4). The position of the internal

and external layers of enamel which touch one another can be easily seen and are in no way arranged as in the deer. Therefore it is undeniable that this deposit must have been formed when the reindeer *(Cervus tarandus)* still lived in the South of France.

M. Boule's discovery is of great interest. It was known that the reindeer extended as far as the Pyrenees, but it was thought that it had not reached the Mediterranean slopes of the Alps. On this subject M. Rivière wrote : " As regards the reindeer it does not exist in the caves of the Baoussé-Roussé, we have never found the least trace of it there. It seems also to be equally wanting in the other Italian caves. Its absence is not to be explained by the epoch at which these caves were inhabited by man ; for at an earlier epoch, when for instance deposits were formed in the Cave of Grimaldi, in which the fauna is certainly more ancient than that of the Baoussé-Roussé, we did not find a single bone of this animal. This absence might rather be explained by climatic conditions, in spite of the presence in the caves of the remains of *Rhinoceros tichorhinus* and of *Gulo spelæus*. In any case it seems pretty certain that the reindeer did not descend to the south slopes of the Alps " (1).

That which appeared quite certain to M. Rivière is no longer so ; for the reindeer did inhabit the southern slopes of the Alps. I will not go so far as to say

(1) Em. Rivière. *Op. cit.*, pp. 265, 266.

that it lived at the Red Rocks, but it is probable that the hunters who dwelt at that spot had not to make very long journeys in search of it. Nevertheless the scarcity of the remains of *Cervus tarandus* must lead us to think that it was not common in this neighbourhood (1).

G. — *Hearths.* — The layer which was deposited in the Barma-Grande during the reindeer age did not only furnish the remains of animals which were used as food by man. It contained many other proofs of human habitation. Here and there we meet with hearths where the dwellers in the caves lighted their fires. They consist of cinders, charcoal and occasionally of charred bones ; sometimes also they contain stone implements, no doubt fallen there by accident. When these hearths are intact one may conclude that the earth has not been disturbed round them since the time when man first lighted his fires on them. Now this is what we notice in several places in the reindeer layer. But we cannot say that the soil remained undisturbed everywhere and that holes had not been dug later at a little distance from the accumulation of cinders and charcoal.

(1) Although I do not consider that it would help to determine the date of this layer, I ought to mention the tooth of a feline animal which is said to have been met with at about the same level as the reindeer's jaw. It is very probable that it came there by accident and that it belonged to the lower strata. But I could not pass it by in silence.

Of the hearths, traces of which were still clearly visible in March 1899, I will mention two. One was situated immediately below the first skeletons discovered by M. Abbo ; the other was two feet below the fourth skeleton found by the same explorer.

D. — *Human handiwork.* — The human beings who had established their dwelling place in the Barma-Grande at the period when the reindeer still existed near them, left in the earth numerous remains of their handiwork. These consist of weapons and tools made of stone, and of bone implements and a few ornaments. These specimens of workmanship of the ancient troglodytes of the Baoussé-Roussé are sufficiently interesting to have a whole chapter devoted to them.

E, — *Human remains.* — Finally the reindeer layer contained human skeletons. These have given rise to so many discussions that I shall have to deal with the subject at considerable length. I will limit myself now to mentioning the existence of human bones in the layer which lies immediately above that of the elephant.

V. — Upper layers.

I have given above the reasons which compel me to pass over almost in silence the upper layers : they have not been studied from a stratigraphical point of view. All that I could say about them

would be but a more or less plausible hypothesis. It is quite probable that the caves of the Baoussé-Roussé continued to be used as shelters by man after the end of the quaternary epoch ; but I have not been able to verify the fact in the Barma-Grande, the upper layers having been completely removed before my first visit in 1892. Nevertheless certain observations published by different authors lead me to believe in the existence of a neolithic layer in the caves of the Red Rocks. These are the remarks to which I allude. Many explorers who examined only the surface of the deposit have found bones of animals of still existing species. M. F. Forel, the learned Swiss archæologist, was struck with the absence of quaternary species in the layers which he explored and he endeavoured to explain the phenomenon thus: « It may have been that the Mentone Caves were too light to be used as refuges by animals seeking darkness and which found in the neighbourhood dens more suitable to their habits. It is also possible that traces of the animals which preceded man's occupation of these caves had been removed or were buried in the cave-earth at a depth to which our excavations did not reach " (1).

M. Ernest Chantre, who explored the fourth cave in 1865 for a depth of one yard, also met with such

(1) F. FOREL. " *Notice sur les instruments en silex et les ossements trouvés en 1858 dans les Grottes de Menton.* " Menton, 1860.

species of animals only as are now existing : viz the wolf, fox, horse, wild boar, goat, deer and rabbit. He mentions the roebuck as doubtful, and is not certain that the bone of some bovine animal which he dug up is that of the urus *(Bos primigenius)*.

But I attach most importance to the opinion of M. Rivière though this may surprise readers after what I have said above. This author while declaring that the deposit in the Mentone caves " belongs, from the surface of the soil to the bottom, to one and the same epoch namely the quaternary " is obliged to admit that the upper layers contain no traces of ancient animals. " It is, he says, only at a lower level than that at which our predecessors in the study of the Baoussé-Roussé stopped, that we have found, though in small quantities, the remains of those large quaternary animals which today are completely extinct " (1). Then why deny the existence of a recent layer, a neolithic stratum ? Do the traces of human handiwork warrant our being so positive ? I do not hesitate to answer in the negative.

In fact the excavators of these caves have noticed that, in the upper layers the flint implements are chipped with great dexterity. M. Costa de Beauregard, after having removed the surface soil of the fourth cave to a depth of five feet, found numerous flints small but finely worked (2). M. Issel who has

(1) Em. Rivière. *Op cit.*, p. 88.

(2) Costa de Beauregard. " *Les grottes Saint-Louis, près Menton (Alpes-Maritimes).*

described the objects collected by M. le docteur Pérès and M. Ph. Gény in the course of their excavations in the Mentone caves, enumerates five polished hatchets, two whet stones, a sling stone, and several articles in baked earth : also a " *fusaiole* similar to those of the Swiss lake dwellings " ; a flat disc not perforated, two weaver's weights (poids de tisserand) and several discs, " roughly shaped and pierced with a hole in the middle, which were apparently weights for nets" (1). I know very well, from declarations made by M. Gény to M. Rivière, that three of the hatchets of which M. Issel speaks came from the Nice Château ; but he does not say that he found the two others with the baked earth pottery in this place, he simply remarks that the specimens of baked earth pottery were not found in *his presence*.

Finally M. Rivière himself found implements of the neolithic age. I will not refer to the polished hatchets which he discovered in the third cave and which I spoke of at the beginning of this chapter. I will content myself with mentioning the tool of " close grained grit-stone the larger end of which is round and much worn by rubbing " and which is drawn on pl. IV fig 31, also a fragment of " a flat disc made of pitch coal and pierced in the centre " shown on pl X fig 17. I may add that a considerable number

(1) ARTHUR ISSEL. *Résumé des recherches concernant l'ancienneté de l'homme en Ligurie.* (*Comptes rendus du Congrès international d'anthropologie et d'archéologie préhistoriques.* Paris, 1867.)

of the objects which are represented in his album are to be met with in the polished stone localities as well as in quaternary, and that the " chalcedony chisel sharpened at its wider end with the opposite extremity forming the handle " (pl. VI, fig 18) is nothing but the chisel which is considered by many archæologists as characteristic of the beginning of the neolithic age.

From all this we may very fairly conclude that a layer at least five feet deep was deposited above the reindeer stratum after the end of the quaternary epoch. During the formation of this layer man continued to frequent the caves of the Red Rocks. It would really be very extraordinary if the formation of cave earth ceased at the end of the quaternary epoch and that these caves in so favoured a country, which has never ceased to be inhabited, should be suddenly forsaken. It is much more reasonable to suppose that if objects typical of the neolithic epoch were not found in large numbers in the surface layers, it is because these layers, being easily accessible, were rifled before Prince Florestan I and M. Grand thought of excavating them. Before the existence of prehistoric man was recognised it is hardly likely that people should pay attention to chipped stones; but a polished hatchet or a vase could not pass unnoticed.

In fact plain reasoning, as well as the examination of facts, lead one to conclude that above the layer of the reindeer age a fairly thick stratum was

formed at the beginning of the present epoch, and that the excavators did not pay sufficient heed to this deposit. This applies to the Barma-Grande as well as to the other caverns. This cave offered far too convenient and natural a shelter to be entirely neglected by neolithic man. It is even probable that if the excavations had been methodically carried on from the first they would have afforded valuable information concerning the period of transition between the quaternary epoch and the age of polished stone. For we know that at Mas d'Azil M. Piette found *coloured pebbles* in a stratum " intercolated between the last layer of the reindeer age and the first of the neolithic epoch ". Recently M. Abbo's son picked up a coloured pebble in the Barma-Grande. Unfortunately it was not in situ, but was found at the entrance of the cave among material which had been brought from the inside. It is therefore quite impossible to ascertain at what level it originally lay; but the find in itself is interesting and deserves a passing mention.

CHAPTER II

The Human Skeletons.

I. — The Human Bones discovered in the first Caves.

I called attention to the existence of human skeletons in the deposit which partially fills the caves of the Red Rocks. M. Abbo discovered five in the Barma-Grande where M. Julien had already found one. Before speaking of these skeletons it will be convenient to mention M. Rivière's finds in the other caves.

The *first cavern*, or *children's Cave*, was so called because it contained the bodies of two children, one of them five or six years old, the other at least four years old. He came upon them at a depth of 9 feet on January 27th. 1874 and July 7th. 1875. These two children were lying side by side in the same hearth at full length, parallel to the longer axis of the cave, with their heads towards the south. Their bones showed no trace of that red colouring which I shall have occasion to mention later on. But on the other hand a great number of small perforated marine shells of the genus *Nassa*, were found near the lowest

lumbar vertebræ, the pelvis, and the upper part of the thigh. This led the discoverer to suppose that the two children must have worn a sort of loin-cloth hanging from the waist and covering a third of the thigh.

Neither the *second* nor the *third* cave contained any human bones.

In the *fourth cave* or *Grotte du Cavillon* the skeleton of an adult male was brought to light on March 26th. 1872 (1). It was lying on the left side paralle to the longer axis of the cavern, at a depth of 21 ft 10 inches. The head lay towards the North, and was raised a little higher than the rest of the body. The left hand was placed below the lower jaw. The base of the cranium and the posterior portion of the trunk were leaning against large rough stones.

About 2 $^1/_2$ inches from the mouth a groove had been dug in the soil 7 $^1/_5$ inches long by 1 $^1/_2$

(1) This skeleton may be seen in the anthropological gallery of the Paris Natural History Museum. The "*Guide de Menton et ses environs*" (13th. edition, 1899), is mistaken in saying of the Barma-Grande, "It was much less reduced in size in 1869 when M. Rivière found in it a human skeleton which was removed by his care to the Paris Natural History Museum. This skeleton is of palæolithic age" (p. 50). This passage contains a double error: firstly the skeleton now in the Paris Museum was found in the fourth, not in the fifth cave, secondly this discovery took place in 1872, not in 1869.

inches wide and 1 $^{2}/_{5}$ inches deep. This groove was filled with a red ochreous powder. The same substance covered the whole skeleton, and imparted to it a deep tinge of red.

The man had been buried with the ornaments and trappings which he wore in life. On his head he seems to have worn a sort of fillet or head band, in the meshes of which were threaded numerous shells all belonging to the species *Nassa neritea*. Twenty-two perforated canine teeth of the deer were collected near the temples. Across the brow lay a bodkin made from the radius of a stag, and closely applied to the occiput were two flint blades. Lastly on a line with the left thigh were found forty-one perforated shells of *Nassa neritea*. These had doubtless formed a leg-ornament analogous to those made of hair or skin and worn by certain chieftains of the oceanic isles.

The *sixth cave*, called "*Bausso da Torre*" or "*Caverna della Ciappa del Ponte*" has furnished two skeletons of adults and one of a child discovered in 1873. The first adult remains were lying at a depth of 12 $^{1}/_{2}$ feet; the second at 13 feet; and those of the child at a level intermediate between these two. The following is the condition in which these human remains were found.

The male skeleton first met with was lying on the back parallel to the longer axis of the cave, with the head towards the entrance. The skull was placed a little higher than the rest of the body:

the left knee was raised above the pelvis. According to M. Rivière this skeleton seemed to have been deposited on the ground without any trench being dug to receive it. A fine flint blade lay by the left shoulder. Three perforated marine shells *(Cypraea pyrum and Nassa neritea)* were picked up below the collar bone. These must have formed part of a necklet. Remains of bracelets (perforated shells and pierced canine tooth of deer) were collected near the lower extremities of the humerus and on a level with the right wrist. Lastly bored shells discovered near the condyles of the thigh bones show that the man must have worn above the knees an ornament resembling that which was on his upper arm. In the earth below the neck and chest M. Géradin is said to have seen under the microscope some hairs from the fur of an animal which may have served as clothing.

The second skeleton of the sixth cave was lying in like manner at full length parallel to the longer axis of the cavern, with the head towards the entrance. The bones were, as in the former case, coloured a deep red by peroxide of iron. It was resting on the left side with the head raised 9 ⅛ inches above the level of the feet. The hands were clenched: the extremities of the fingers being applied to the palm. Numerous perforated shells and pierced canine teeth of the deer, found near the head, the cervical vertebrae, the elbows and the wrist, indicate that the man must have worn

a fillet, a necklace and bracelets. There was besides, near the upper end of each thigh bone, a perforated shell (Cypraea).

The remains of the youth, about fifteen years old, were lying prone, and parallel to the second skeleton, but with the head towards the interior end of the cave. The bones were not coloured red nor were any traces of weapons, ornaments or waistcloth found near it.

The *three last caves* were very imperfectly explored, and yielded no human bones. The seventh, purchased by Prince Albert I of Monaco, is the one which has lately been searched with the greatest care by l'Abbé de Villeneuve. These excavations, conducted on truly scientific principles, did not result in the discovery of any traces of human occupation, but they furnished data for the interesting stratigraphical observations which I have already presented to the reader.

II. — The Skeletons of the Barma-Grande.

A.— *The first discoveries.*

M. Rivière, to use his own words, " met with no human bones in the Barma-Grande excepting a fragment of the right side of a lower jaw with two teeth, the second premolar and the first large molar. These were not in the least worn, but had

the tubercles fully projecting : consequently they were those of a youth " (1).

In the month of February 1884, M. Louis Julien discovered in the cave a human skeleton, the skul[1] of which is preserved in the Mentone Museum. On the position of the skeleton we have some information which is not devoid of interest. It lay on its back at a depth of 28 feet, parallel to the longer axis of the cave. that is from North to South, and along the left wall, " Three large flint flakes lay, one at the top of the head, the other two on the shoulders like epaulettes " (2) The head was covered with " a thick coating of red ochre, and beside it were found some rough lumps of flint, a few unworked flakes of the same substance, also some teeth of the ox, deer and goat. It is worthy of note that this skeleton was not accompanied by any small stone implements like those met with at a higher level, but by three great flakes of flint. M. Rivière had already observed something analogous, and the same circumstance recurs in M. Abbo's finds.

This gentleman came upon another human skeleton on February 7th 1892. I have explained under what conditions this discovery took place. They were digging out the earth from the cave, not with a view to archaeological research but simply to use it for

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(1) Em. Rivière. *Op. cit.*, p. 195.

(2) Conf. *L'Homme*, 1884, p. 186. (Letter from Mr Wilson, United States Consul, Nice.)

agricultural purposes, when on Sunday February 7th one of the owner's sons, who was amusing himself by turning up the soil with a pick, found a human skull. The boy's father, on hearing of it, realising the interest of the find, had the entrance of the cave boarded up.

I have related in L'*Anthropologie* (1) how I came to hear of the discovery. M. Emile Delerot, honorary curator of the Versailles Library, was staying quite close to the Baoussé-Roussé, and as soon as he heard the news, he hastened to inform M. Alex Bertrand of the Institute, who conveyed the information to his colleague M. Hamy. After consulting the Minister of Public Instruction he requested me to set out at once for the spot, which I did accordingly. M. Delerot followed the progress of the excavation with great interest, and during my stay in the neighbourhood of the Red-Rocks he was present daily at the exploration which I was conducting. I mention this with the sole object of showing that my investigations were made in the presence of witnesses who were in a position to verify all my statements.

When I reached Mentone on the 22rd of February a fortnight had elapsed since the discovery of the first skeleton. A second and a third had been brought to light, but unfortunately more than one inquisitive

(1) R. VERNEAU. " Nouvelle découverte de squelettes préhistoriques aux Baoussé-Roussé près de Menton ". (*L'Anthropologie,* t. III, 1892, p. 512-540.)

intruder had entered the cavern in spite of the barrier and had trodden on the bones.

The first observations made by M. Abbo were confirmed by M. Delerot ; and I was able to verify them to some extent myself. Above the bodies lay a thin covering of red earth, quite different to the soil which filled the rest of the cave. This red earth, the same which M. Julien had noticed covering the skull of the skeleton discovered by him in 1884, contains a large quantity of peroxide of iron which has imparted to the bones a strong colouring noticeable as soon as the remains were exposed to view.

On my arrival the skeletons, only just uncovered, were still coated with this ferruginous earth. It was easy for me to ascertain that a thin layer of it existed below them. A few borings made near these remains convinced me that all round them the nature of the soil was quite different. The earth had been broken up in front, but at the back it was still at a higher level than the skeletons. Now by carefully examining the deposit at this end, it was not difficult for me to ascertain that it had been cut vertically and in a straight line slightly exceeding the length of the bodies. A trench the further side of which was still visible, had been dug in the cave-earth. At the bottom had been laid a bed of this ferruginous earth, which had been fetched from some distance probably on account of its attractive colour. The bodies had then been placed on this bed and covered over with the same soil. The bottom of the trench was about eight

yards below the level to which the cave had been originally filled, for M.Abbo had already removed six yards of earth and he had had to dig two yards deeper still before reaching the skeletons. These lay therefore at about the same level as the one which M. Julien found in 1884 (28 feet), that is at a much greater depth than all those previously discovered in the other caves by M. Rivière.

The new skeletons lay parallel to one another and across the cave; the heads towards the east and all but touching the right wall. The first was scarcely one yard from the present entrance of the Barma-Grande, but as the cavern has been considerably reduced in length by the blasting of the rock, the interment must originally have been somewhere in the middle.

The three skeletons were not all in the same position (fig. 5). The one nearest to the entrance was that of a man; it was lying on its back, but the upper part was curved in such a way that the skull rested on its left side. The left arm was extended along the side of the body while the right was brought across the thigh.

The middle skeleton was that of an adult woman, still young, for although the epiphyses were consolidated with the diaphyses and the upper and lower median incisors showed some signs of wear, the wisdom teeth were still in their sockets. This woman was lying entirely on the left side, with the legs stretched out and the forearms flexed so that the

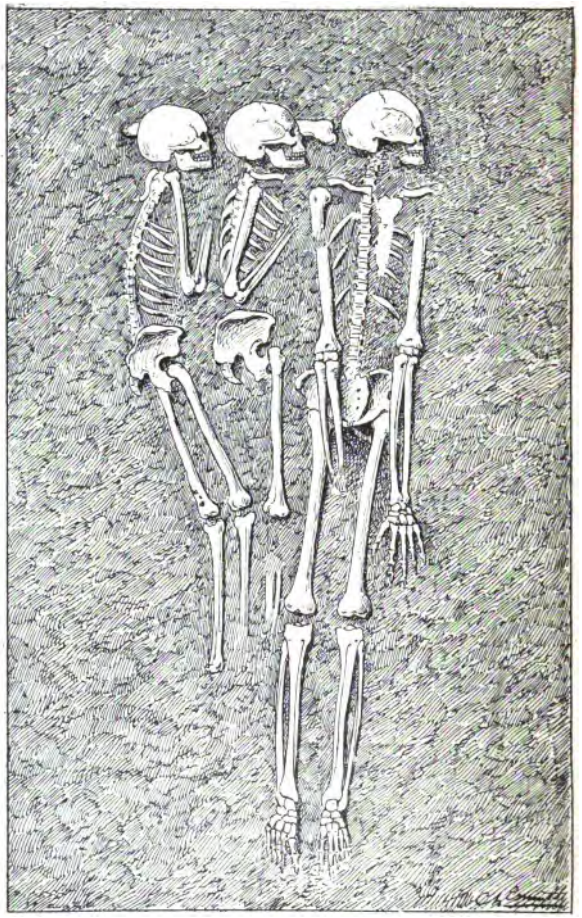


FIG. 5. — Position of the skeletons found in 1892 by M. Abbo.

hands were on a level with the chin. The skeleton furthest from the entrance cannot be assigned to either sex. This is no doubt on account of its age; for judging by the long bones of the limbs which are not joined to the body, and by the wisdom teeth which are still entirely sunk in their sockets we may assert that the person was young. We should not be far wrong in attributing to this youth an age of

FIG. 6 and 7.— Canine teeth of deer, perforated and ornamented with striæ.

about fifteen years. This skeleton was, like that of the woman, entirely on its left side; the forearms were also bent so that the hands reached the chin, the thighs and legs showed a slight curve.

These three human bodies had been buried with their ornaments and a few implements.

On the man's head were found the canine teeth of deer perforated and ornamented with lines on the crown (figs 6 and 7), also vertebræ of fish, and shells with holes drilled in them. These vertebræ belong to a species of fish of about the size of a trout, the shells

belong to the species *Nassa neritea*. Round the neck the same skeleton wore a collar made of 14 deer's canines, a few vertebræ similar to those just mentioned, and some pretty bone pendants decorated with lines (fig. 8). Pendants identical with these were found on the forehead and on a level with the thorax, side by side with vertebræ of fishes drilled through their axes and larger than those found on the head and neck. They are the bones of a kind of salmon (fig. 9). After my departure they discovered, still

FIG. 8. — Bone pendant ornamented with striæ.

FIG. 9. — Perforated vertebra of salmon.

near the chest, a curious ornament which was thought to have been made from the antler of a stag, but which seems rather to be a piece of carved bone or ivory (1). It might be very fairly compared to two olives joined end to end (fig. 11). At the point where they are joined, there is a constriction which enables the object to be suspended without the necessity of boring a hole. The entire surface of this curious pendant is ornamented with little parallel striæ. On

(1) I wished to make a microscopic section which would have enabled us to ascertain whether it was bone or ivory, but the object is so friable that the small fragment we took crumbled to dust.

either side of the left tibia of this man lay a large pierced shell of the genus *Cypræa,* both were found below the knee and are thought to have been threaded on a string. Lastly, just before my arrival, M. Abbo had found on a level with the left hand a very fine flint blade, smooth on one side and worked on the other. This implement measures 9 ⅞ inches in length and 1 $^{9}/_{10}$ inches at its maximum width. The chippings are particularly numerous towards the broader end. In my first memoir on the subject I expressed myself in the following terms: " The authenticity of this specimen has been contested, or rather it is said that M. Abbo possessed it before the second discovery of human skeletons. This assertion is formally contradicted by him and by those who were present at the finding of the blade. I am furthermore inclined to believe the master quarryman, for this celt is exactly similar to one I saw myself in situ under the head of the skeleton of the youth, and which I dug out with my own hands after having removed the pieces of the skull. Moreover another blade, 10 ⅞ inches long by 2 inches wide, was found in the left hand of the second skeleton, that is exactly the position indicated by M. Abbo for the first blade, and he could not have foreseen that another would be found on a level with the left hand of the woman. "

It is M. Rivière who affirmed that the blade in question had been seen by M. Saige, archivist of the Principality of Monaco, in the hands of M. Abbo in

1885 — that is seven years before the discovery of tho skeleton. I was right in reserving my judgement, for a few weeks ago l'abbé de Villeneuve assured me that M. Saige had no recollection whatever of having made such a statement. We may therefore regard the implement found on a level with the left hand of the man as quite as authentic as the one discovered in my presence.

The skeleton of the woman had the head propped against the femur of an ox, the lower third of which projected beyond the forehead. The ornaments similar to those of the man, were less numerous. On a level with the skull were collected *nassa* shells and perforated vertebræ of fish, also a bone pendant which was not discovered till later. No collar of deer's teeth was found on the woman, who however had on her chest the pendant of the shape of a double olive. This ornament measures 2 $^{1}/_{5}$ inches long with a maximum width of $^{7}/_{10}$ inch. In the left hand she held the large flint blade which I have just mentioned.

The head of the third skeleton lay, as I have already said, on a fine flint implement measuring 6 $^{4}/_{5}$ inches long by 1 $^{9}/_{10}$ at its widest point. The broadest part of this blade, which projected behind the occiput, is fairly carefully worked in the shape of a scraper (grattoir).

By removing the pieces of the skull of this skeleton, and by using great care, I was able to find out very exactly the arrangement of the ornaments which had been worn on the head and neck. On the

forehead there were, as on the man, several of the pendants represented in fig. 8. The skull was covered with vertebræ of trout and perforated shells *(Nassa)*. A pretty necklace passed a little bit below the right angle of the lower jaw, but below that it had slipped and the component parts lay under the left temple. The different pieces of this collar were held in the position which they had originally occupied, by the earth into which they had been pressed. They comprised vertebræ of fish, nassa shells, and the canine teeth of deer, each specimen of course being pierced. The vertebræ were arranged in two parallel lines, and below them a row of *Nassa neritea*. At intervals these three rows were interrupted by a deer's tooth ornamented with striæ. Fig. 10 shows with how much symmetry the whole was put together : first a set of four vertebræ, next four more vertebræ, below these again three Nassa shells. Then after the break formed by the deer's tooth followed a similar arrangement of bones and shells. This necklace must certainly have been very ornamental.

The youth also possessed an ornament of his own in the form of a double olive. It was found after my departure near the left hand. As is shown by fig. 12 it is still partly embedded in a very hard matrix which encloses also a certain number of small fish vertebræ.

Several ornaments were collected between the skeletons, and they could not be attributed to one more than to another. Between the man and

the woman two large perforated Cypræa shells

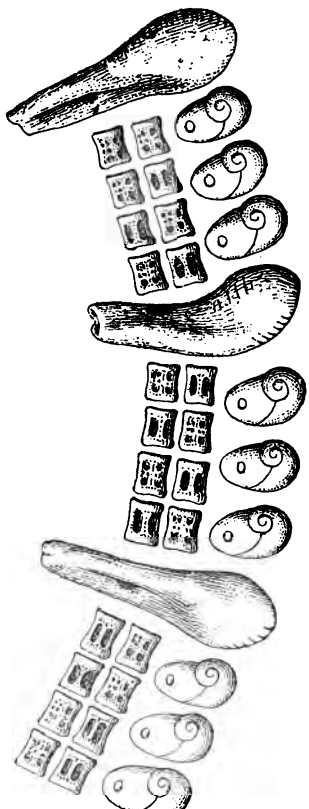
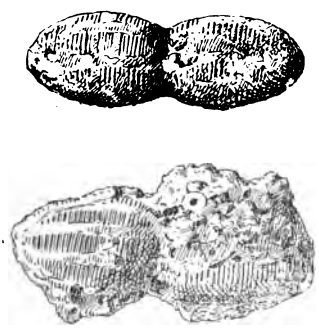


FIG. 10. — Fragment of the youth's neklace.

were picked up, and one of them was on a level

with the man's right knee. We have just seen that this individual had two of these shells below the left knee; it is therefore quite possible that the two discovered later belonged to him and matched the others. Near the woman and between her skull and that of the young person, lay a



FIGS. 11 and 12. — Pendants in the shape of a double olive.

perforated shell *(purpura ?)* which had probably formed part of the ornaments of the former.

Finally, the burial place discovered by M. Abbo in 1892, entirely resembles those which M. Rivière found in other caves. The bodies had been interred in the same ferruginous earth; the flint blades collected near the skeleton were similar; but those found by M. Abbo were larger than M. Rivière's. specimens. The ornaments are nearly identical although those of the Barma-Grande show finer

workmanship. Consequently we may safely assume that, notwithstanding the difference in level, all these interments belong to the same period. We shall see that there is further evidence in support of this view.

B. — *The last discoveries.*

On the 12 th. of January 1894 M. Abbo, who had begun to clear out the bottom of the large cave, brought to light another human skeleton. This body lay 21 feet 8 inches behind the first and 5 feet 4 inches below them. Instead of lying across the cave it was extended parallel to the longer axis with the head towards the south. The whole body was turned slightly on its left side with its upper arm close to the ribs and the forearm bent in such a way as to bring the hand up to the chin. The right arm was slightly separated from the thorax, with the forearm and hand placed almost at right angles over the chest. The femora converged slightly near the knees, and the legs crossed so that the tibia and the shinbone of the right leg lay over the left.

The skeletons discovered in 1892 had been buried in a layer of ferruginous earth, brought from a distance), without any further precautions for their preservation. The body which was brought to light

two years later was, on the contrary, protected by three large slabs of stone which partially covered it. One of these was placed over the legs, the second was above the thighs and the lower part of the trunk, and the third covered the head and chest. The first two rested immediately on the ground, the last, roughly triangular in shape and measuring 2 feet 4 inches in one direction and 2 feet 2 $^{2}/_{5}$ inches in another, was supported by three other blocks of from 10 to 15 inches in diameter. The slabs and the blocks which supported the stone above the head are of limestone, the front slab had a slight coating of stalagmite.

In spite of the existence of this protective covering over the body, the interment seems to be of the same age as the others. It will be shown later that the physical characteristics of the individuals are identical. The funeral accessories are exactly similar. Thus the man — for it was a male skeleton, — wore on his forehead perforated *Nassa* shells, and had to the left of his head two perforated canine teeth of deer, also three of those little pendants represented by fig. 8, and a shell necklace. Many *Nassa* shells were still adhering to the sixth cervical vertebra at the time of my last visit to the Baoussé-Roussé in March 1899, and others were to be seen on a fragment of conglomerate lying near the neck on the left. Lastly near the left hand was found not a large flint blade but a fair sized piece of gypsum.

Some time after the discovery of the skeleton in

question, M. Abbo found a fifth still nearer to the end of the cave. It was separated from the feet of the last by a distance of 2 feet 8 inches and was lying at the same level. This skeleton, which was completely charred, was rather incomplete. Nevertheless it was possible to note that the thighs were slightly drawn up, and the legs doubled up, so that the heels touched the haunch. The bones being in their normal position we may conclude that the body had been cremated on the spot. Moreover traces of a large hearth more than 2 feet deep were found beneath the remains. We shall see that in this case also the cremated body is of the same type as the others. Like them he had his ornaments of *Nassa neritea*, specimens of which were picked up near him by M. Abbo. So that we may conclude that they are all contemporaneous.

CHAPTER III

Human Handiwork.

Man having occupied the Baoussé-Roussé caves from the beginning of the quaternary epoch to the neolithic age, inclusive, it is only natural that he should have left in them numerous specimens of his handiwork. But during this long occupation the workmanship of our ancestors improved considerably ; their implements were gradually modified, and consequently the tools found on the surface ought not to be identical with those which lie at the bottom of the deposit. To study thoroughly the implements found in the caves, it is necessary to classify them according to the layers in which they were found. This is just what those authors, who have published works on the excavations they have made, have not done. It will therefore be impossible for me to borrow from their books. Nevertheless I may sometimes glean some information which I shall make use of.

The investigations of M. Abbo, in the Barma Grande, fill up this blank to a great extent. It is certain, as I have said, that the examination of the upper layers has been completely neglected.

It is no less certain that the investigator was not prepared to make systematic excavations. Nevertheless the observations which he made, and which I verified to a great extent, are of genuine value. His archæological knowledge was far from being wide enough to admit of his selecting his facts and rejecting those which did not suit him, or of his purposely attributing to one layer objects which might have been found at another level. I placed full confidence in his statements when I ascertained that the information which he gave me about his finds coincided perfectly with the results of the investigations carried out by a number of scientific men during the last half-century. And there is a fact which further increases my confidence in him. In many instances he did not hesitate to express his doubt as to the exact position of certain objects. Had he not been reliable he would no doubt have acted in a different way; for he would have sought, by mentioning some particular level, to increase the value of a specimen which I declared almost devoid of interest unless he could mention the exact spot where he found it.

The reader will forgive this little digression which I do not deem useless. For efforts have been made to throw discredit on the excavations of M. Abbo, and it was as well to show that the accusations, which have been made against him, cannot be substantiated. I have already dealt with

(p. 71) the particular case of the flint blade found near the left hand of the first skeleton, and were I to enter upon a discussion it would be easy to prove that the other insinuations are equally groundless.

I now come to the examination of the finds in each of the layers, beginning with the lowest.

I. — Elephant Layer.

I must first remind the reader that this layer has as yet been explored only to a limited extent. Nevertheless it has already furnished several specimens presenting the appearance of great antiquity, and which, in spite of the imperfect workmanship, afford undisputed evidence that man occupied the Barma-Grande during the epoch in which this stratum was formed.

We are particularly struck, on examining the objects found in this layer, by the abundance of implements made of gritstone. One might almost be tempted to account for the rudeness of the implements by the nature of the stone, which, as we know, is difficult to work; but the flint implements do not show any higher finish.

Among the *gritstone implements* I will mention a *scraper*, 2 $^{4}/_{5}$ by 1 $^{3}/_{5}$ inches, of a nearly rectangular shape and rather clumsily chipped on its longest edge. It belongs to a type which has

been fairly frequently met with at Moustier, and even at Chelles. A few *blades*, rarely exceeding 2 $^{4}/_{5}$ inches in length, a few *lance heads*, of the so-called Moustier type, and the scraper comprise the gritstone implements which have been found in the elephant layer.

Apart from the plane of percussion (" plan du frappe ") and bulb of percussion, which are always clearly defined, these tools show no traces of human

FIG. 13. — Lance-head of the Moustier type.

workmanship other than a few flakes chipped from the surface opposite the bulb. One lance-head however has been clumsily worked on this surface; it measures 2 $^{1}/_{2}$ inches in length, 1 $^{3}/_{10}$ inches in breadth and $^{7}/_{10}$ inches in thickness. The great thickness of this weapon prevented its being very penetrating and it would seem that the owner had attempted to thin it down. Several strokes

had been given near the plane of percussion; but the flakes which were detached proving small on account of the bad quality of the stone, the workman had decided to thin down the edges only. These show a certain number of coarse chippings.

The *flint implements* which have been met with up to the present consist entirely of scrapers, blades, and lance-heads, of the same type and showing the same clumsy workmanship as the gritstone tools (fig. 13). I give here the illustration of one of the scrapers (fig. 14).

It is one of the largest specimens which have been met with outside the burial places, for its length exceeds 4 $^{2}/_{5}$ inches and its maximum breadth is 2 inches; it is an inch thick in some places. This implement has been worked chiefly on the convex edge; the other side, being perfectly adapted to the hand, has been left untouched. I have figured in my book *l'Enfance de l'Humanité* a scraper found in the "balastière" of Chelles, which singularly resembles the one found by M. Abbo in the lowest layer which he explored.

Amongst the flint implements given me as having been found in the elephant layer, is a small short *scraper* of reddish jasper, which is wrought all round its perimeter with a series of remarkable little chippings (fig. 15).

Its resemblance to certain specimens of the Madeleine type is so striking, that I am inclined to think that it must have slipped down from the

layer lying above that in which it was found.

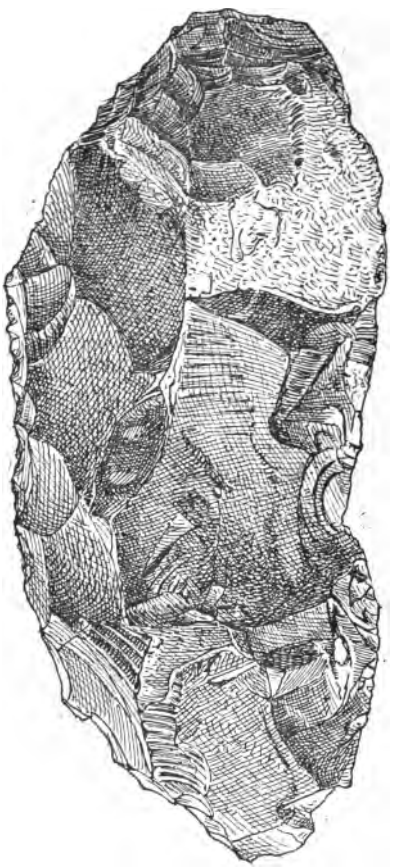


FIG. 14. — Large flint scraper from the elephant layer.

It is possible that it may have fallen from a higher level into the trough dug by M. Abbo to disinter the remains of the elephant which I have spoken of above. This is all the more probable because this scraper is the only specimen of superior workmanship found in the lower level.

In short, the stone implements of the elephant layer absolutely resemble those of the so-called

FIG. 15. — Jasper scraper of the Madeleine type.

Moustier type. It would seem to be the same in the other caves if we are to judge by several passages in M. Rivière's book. For this author declares that in the Cavillon Cave he discovered, when he got to a depth of 34 ft, " the first worked gritstones and limestones of the fourth cave (Cavillon). These implements are analogous as regards form and dimensions with those we found at a depth of 12 ft 6 inches in cave N° 6,

and which will be discussed presently " (1). He figures one of these specimens; it is a " gritstone lancehead of the Moustier type showing ridges of fracture ("arêtes de taille"), but it is not worked along the edges". Thus at the bottom of the Cavillon cave were found implements of very primitive form, precisely as in the Barma-Grande, though M. Rivière repeatedly asserts that the workmanship is the same in character from the surface down to the bottom of the caves.

The workmanship of the Moustier type would seem to commence at a much higher level in the sixth cave. M. Rivière expresses himself thus : " Stone weapons and implements have revealed to us, since the discovery of this skeleton, a most interesting fact viz : — the existence of a totally different kind of workmanship from that which we had hitherto found in the caves of the Baoussé-Roussé — different at least as regards the nature of the materials used by the inhabitants of the caves of Mentone, and about which we said only a few words when describing the fourth cave. For at a depth of 12 ft 6 inches, worked gritstones and limestones were found, at first interspersed with flint implements, but lower down found by themselves as far as the lowest hearths. The discovery of these gritstone and limestone implements indicates a complete change

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(1) Em. Rivière. *Op. cit.*, p. 175.

in the choice of material used by the cave-dwellers for the manufacturing of their tools.

Thus the number of flint implements diminishes considerably in this layer; and they disappear completely in the lower levels, where they are replaced by implements, weapons, and tools, made of more or less silicious gritstone, hewn generally with rough strokes and more or less worked along the edges. These specimens are of much greater bulk than the flint tools. Formerly — that is in the upper layers — worked gritstones were but rarely found, and then as quite an exception " (1).

I have not hesitated to quote this passage in its entirety, in spite of its length, for it proves that in the fourth and sixth caves, as in the Barma-Grande, there existed at the bottom a type of implement very different from that met with in the higher levels. In the sixth cave the Moustier layer was found at a depth of about 13 ft from the surface. If we consider that the total depth of the deposit was only 21 ½ ft, we see that the Moustier layer must have been only 8 ½ ft thick. The layer in M. Abbo's cave was about the same.

How is it that M. Rivière did not mention this layer in connection with the other caves? We must first state that the seventh was not explored

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(1) Em. Rivière. *Op. cit.*, p. 231.

by him, and that l'abbé de Villeneuve, who has just excavated it with the utmost care, found neither human remains nor relics of human industry. The eighth cave is in reality, to use M. Rivière's words, "a little rock shelter". The ninth, in the words of the same author, "shows no sign of having been the abode of man, and contains no implements in bone or flint". Thus there remain but the first, second, and third caves, in none of which he mentions the presence of the Moustier layer. But did M. Rivière excavate these caves to the bottom? I will pay no heed whatever to local gossip, but will confine myself simply to the work in which are recorded the investigations of the excavator. In the first cave two skeletons were found at a depth of nine feet; no phrase indicates that the search was continued lower down. The second cave, which we see is mentioned as a "pseudo-cave", contained on the surface a stratum nearly seven feet thick which was searched. The layers beneath were explored only two feet further down : the total depth excavated amounting to about nine feet. Finally, M. Rivière tells us absolutely nothing about the depth which he reached in the third cave.

Are we not therefore justified in supposing that, if in the caves occupied by man the Moustier layer has not always been met with, it is because the excavations have not been carried on right

to the bottom of the deposit? In any case we can affirm that in the three caves in which the digging has been carried down deepest this layer has appeared ; and that the greater part of the rough implements contained in it were made of gritstone or limestone. I have mentioned that in the Barma-Grande this layer furnished a few flint tools. I ought also to mention a large polisher in ivory, which was found outside the cave (reduced to its present dimensions) not far from the elephant.

II. — Reindeer Layer.

A considerable quantity of worked objects was found in the layer of the reindeer age. I do not intend to enter upon a detailed account of them. I will merely endeavour to give an exact idea of the principal types met with.

A. — *Stone implements.* — These are extremely numerous, nearly all of them are of flint of different varieties — some yellow and semi-opaque, others streaked or veined in different colours. On the whole the stone implements found in this layer are small, a fact already noticed by M. Rivière. One of the largest blades collected by M. Abbo does not exceed 4 $^1/_2$ inches in length and 1 $^1/_5$ inches maximum breadth (113 $\times$ 30 millimètres).

Blades or knives, also plain flakes, are found in

abundance. They are sharpened sometimes on both edges, sometimes on one edge only, the other forming a kind of blunt back. Some of them are astonishingly small, 1 1/5 × 1/5 inches (30 × 5 millimètres). The edges show no working, and if in certain cases we notice slight " scaling ", to use A. de Quatrefages appropriate expression — this is due to wear.

Scrapers are nearly as common as knives. They are blades having always a rounded extremity. These scrapers are worked sometimes all round, sometimes on the edges and at one end (figs. 16) ; others again at both ends (called double scrapers), while some are worked at one end only (figs. 17-20). They all belong to the Madeleine type.

Whether short or long, careful working will always be found on the convex extremity, and the chips detached are small.

In a few of these scrapers the other end is made into a chisel-like edge by striking off a single flake ; these are the " engraving-scrapers " (" grattoirs-burins "), intruments admirably adapted for working on bone (fig. 21). These are also found without the worked scraper end.

We also find *borers* ; these are instruments carefully worked at one end so as to obtain a point (fig. 22). They are sometimes worked on one or even both of their edges.

Lance-heads (" pointes ") are also extremely common. They are usually worked on both edges and at

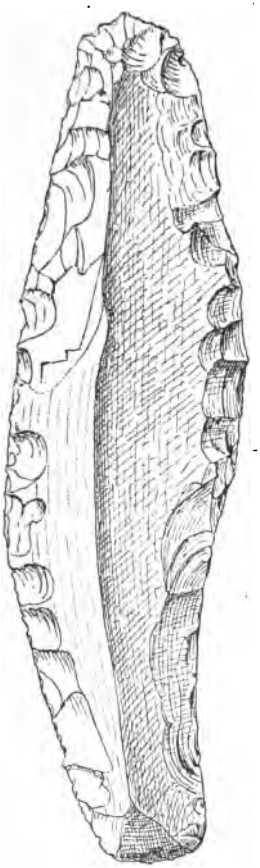
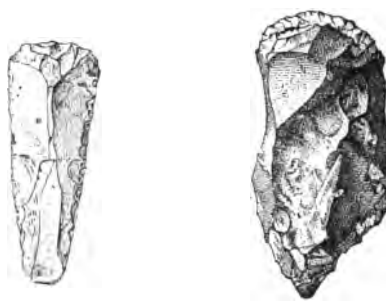


FIG. 16. — Long scraper worked at the edges.

the point (fig. 23). Their size, often very small, rarely exceeds 2 $^{2}/_{5}$ inches in length.

I have not yet mentioned some very small flints, comparatively long, and triangular in section. They have only one cutting edge and the sides which form this edge are smooth and without any trace of working.

When we find these edges chipped it has hap-

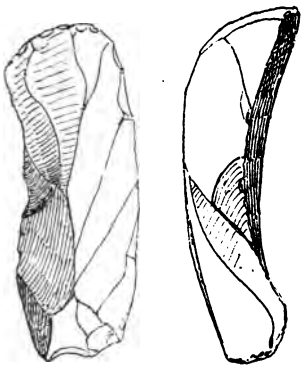


FIGS. 17-18. — Scrapers of the Madeleine type.

pened in the course of use as is very distinctly seen in the implement drawn in fig 24. This is a case of accidental, not intentional, chipping. The third surface, which forms, so to speak, the back of the tool, has on the contrary been carefully worked.

Particular care seems to have been devoted to the chipping at the point. These blades with a flattened edge (" lames à tranchant abattu "), figs. 24-26,

as Messrs Cartailhac and Boule (1) have called them, were probably used to polish small pieces of bone



FIGS. 19-20.— Front and side view of a scraper from the reindeer layer.

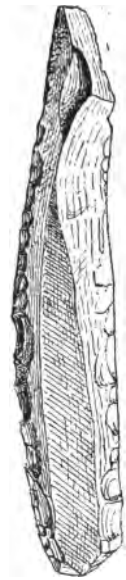


FIG. 21. — Engraving-scraper (reindeer layer)

or shells with the sharp edge, and to perforate them with the point. The authors, whom I have just mentioned, collected a great many of these

(1) EM. CARTAILHAC et M. BOULE. *La grotte de Reilhac*. Lyon, 1889, p. 34.

blades in the cave of Reilhac (Causses du Lot).

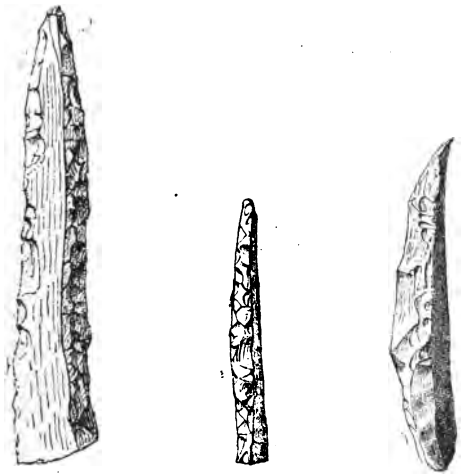
FIG. 22.— Borer from reindeer layer.

FIG. 23. — Lance-head (pointe) worked at the edges and point : reindeer layer.

They found them in a layer which they consider

as belonging to the end of the reindeer period, and forming almost a transition between the quaternary and the present epochs.

I cannot bring to a close this short enumeration of the stone implements of the reindeer period without mentioning a few scrapers, rather like those



FIGS. 24, 25, 26. — Blades with a flattened edge from the reindeer layer.

of the lower layer, and a few lance-heads, showing no chipping, which belong unmistakably to the Moustier type. They resemble the specimen drawn in fig. 13. Are we to consider them as dating from the same period as the implements I have just been

describing? This might be maintained. We know certainly that these primitive types persisted, though in small numbers, to a comparatively recent period. I have myself collected in dolmens — that is in the monuments of the polished stone age — scrapers and lance-heads, which archæologists who judge of the age of an implement entirely by its shape, would have assigned to the Moustier period.

But it is also quite possible that the tools which I have alluded to, may have originally come from the lower stratum and been transported to the higher level. For the desposits had been disturbed in many places in the Barma-Grande; and, to judge by the way the animal remains were mixed, this must have been the case in several other caves. Apart from this supposition, there is another explanation: these implements of the elephant layer may have been found after this stratum had ceased to be formed, and carried into the cave during the formation of the reindeer layer. A fact which I noticed in March 1899 will explain how this may have happened.

By examining the different layers which have accumulated in the cave, it will be noticed that they are regularly inclined downwards towards the entrance. We may thus conclude that the opening offered no barrier to the shelving deposit, some of which would slide out. Under these conditions the detritus, which was gradually filling up the cave, would always end at the mouth in a sort of sloping talus, the lower layers projecting further than the

upper ones. Thus, the lower stratum being easily accessible at the mouth of the cave, it is quite probable that the people who sheltered there may have had their attention attracted by objects protruding from the earth, and may have carried them into their dwelling. I am all the more inclined to believe

FIG. 27.— Ankle bone of deer used as a pendant.

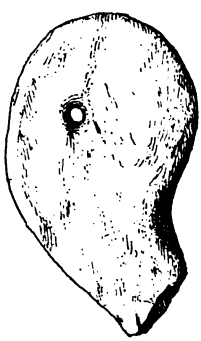


FIG. 28. — Pendant made from the end of a collar bone.

this since I have myelf obtained specimens of a primitive type and fragments of breccia collected at a comparatively high level. The fragments of breccia were isolated in loosely compacted soil and greatly resemble those which may be found any day in the elephant layer.

However this may be, it is certain that the mixing of the remains of animals of different periods has been noticed, and that different types of workmanship occasionally appear in the same deposit. For instance M. Abbo found in the reindeer layer the canine

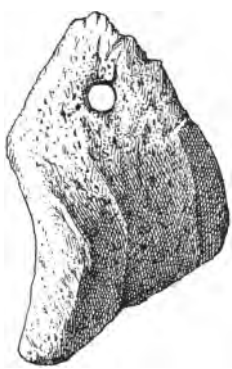


FIG. 29. — Epiphysis made into a pendant.

FIG. 30. — Fragment of a bone cut out as a pendant.

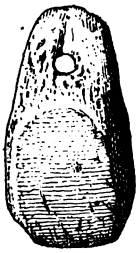
tooth of a feline animal. This was lying at about the same level as the skeletons.

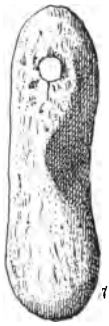
B. — *Bone implements and ornaments.* — The bone implements from the reindeer layer are few; they consist of bodkins and polishers on which it seems needless to enlarge.

The ornaments in bone and shell are of a very rudimentary type. I had several of them drawn for my first work, and I will here reproduce these

figures which will dispense with the necessity for a detailed description.

The ankle-bone of a deer (fig. 27), the end of a





FIGS. 31-32. — Bone pendants slightly polished.

collar bone (fig. 28), or the epiphysis of any bone

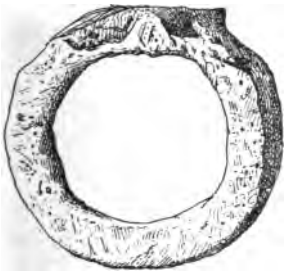


FIG. 33. — Ring sawn out of a bone.

FIG. 34. — Shell pendant.

(fig. 29) sufficed to constitute ornaments as soon as a hole had been bored to hang them by. These pen-

dants were sometimes roughly shaped (fig. 30) or slightly polished (fig. 31, 32).

In other cases a bone has been sawn across in two places close to one another and thus a ring obtained which could easily be hung (fig 33). The bone was often replaced by a sea-shell (fig. 34) which we recognise as a pendant only by the hole bored in it.

In the other caves M. Rivière found the same bone implements and ornaments and the same shell pendants, all of which he describes in great detail and most of which he figures. Besides bodkins and polishers, he mentions: — *poignards*, which are nothing else but big bodkins; *flat lance-heads*, sometimes split at the base to facilitate fastening to the shaft; *long narrow lance-heads*, with the base cut like a chisel so as to be easily inserted into a split in the shaft; *objects sharpened at both ends*, and polished all over; and lastly *bone needles*. Some reindeer phalanges, bored on one side as far as the hollow centre, have long been regarded by archæologists as *whistles*. All these implements, etc., must be derived from the reindeer layer, for they entirely resemble the innumerable objects discovered everywhere in the deposits of this period.

C. — *Engraving and sculpture.* — In this country the reindeer men have nearly everywhere shown their artistic instincts. Was it otherwise with the men of Baoussé-Roussé? Until quite recently this

might have been supposed. M. Rivière figured only two bones showing lines cut in them : one presents two series of three transverse and parallel strokes; the other is an ox bone which shows irregular lines traced in different directions. M. Salomon Reinach has recently brought to our notice (1) objects of a widely different interest, and which I cannot pass over in silence since they come from the Barma-Grande. They were bought in 1896, by the Museum of Saint-Germain, from M. Julien, who, as we know, had carried on excavations in the cave twelve years before. At a depth of between four and five yards a statuette was found, also " a hemispherical object, in steatite, ornamented with incisions, and another in schist, of an oblong shape, with incisions on both surfaces ". At this level we ought still to be in the reindeer layer, which seems to have attained a considerable thickness in the Barma-Grande. Moreover M. Julien declares that he found numerous flint gravers together with these objects. Here is M. Reinach's description of the statuette :

" The substance, a semi-opaque yellow steatite, has its surface rather badly damaged in several places. The figure is 1 $^4/_5$ inches high and $^2/_5$ in

(1) SALOMON REINACH. " Statuette de femme nue découverte dans une des grottes de Menton. " *L'Anthropologie*, t. IX, 1898 (avec 4 figures et 2 planches).

maximum thickness (47 × 12 millimètres) : the lower parts of the legs are missing. The head, which shows no features, is oval with a receding forehead. A big tuft of hair falls onto the nape of the neck, recalling in a striking manner the arrangement of the hair in some of the primitive Greek statues. The breasts are enormous and hang down onto the stomach. There are no arms.

The middle of the body shows a large projection which might be taken at the first glance for a girdle with a buckle in the middle. But as there is no trace of a belt behind, this explanation will not do. The two pads above the thighs are really folds of fat, and the middle protuberance is exactly analogous to the one to be seen in the same position on one of the statuettes discovered by M. Piette at Brassempouy (1). M. Piette writes thus : " The stomach is flat... on the lower part of it is a big lozenge-shaped protuberance, very prominent..... I have shown this statuette to many people, most of whom were of the opinion that it represented a woman whose " mont de Venus " was grossly exaggerated ". It is the same with the Mentone figure (2). M. Reinach adds as a note : " On the surface of this protuberance can be distinguished an irregular streak running

(1) *L'Anthropologie*, 1895, pl. VIII, fig. 1 *a*, 1 *b*.
(2) *L'Anthropologie*, 1895, t. IX, 1898, p. 30.

downwards which seems to have been traced intentionally. It might be an additional indication of the sex."

M. Reinach's article surprised some savants who are disposed to condemn as spurious, specimens which they do not describe themselves. How, they ask, could twelve years have elapsed without the existence of this statuette being known? M. Julien had answered this objection beforehand by confessing that, acting upon advice given him, he had concealed the discovery for fear of making the other finds in the cave appear to be less ancient. Moreover, being often called away to Canada, and not attaching much importance to the collection which he had made, it was only in 1896 that he showed to Messrs Reinach and de Villenoisy the objects bought by the Saint-Germain Museum the interest of which he did not in the least suspect.

M. Rivière, who has not seen the figure, supposes it to be spurious because Baron Bruining bought in 1892 some sham specimens said to have been discovered in the caves of the Red Rocks ! But if " the antiquity of the statuette, said to be from Mentone, the authenticity of which is contested by some and upheld by others, were definitely confirmed, it would still remain to be proved that it was really found in one of the caves of the Baoussé-Rousé (1) ". It is

(1) *Bull. de la Société d'Anthropologie de Paris*, 1898, p. 153.

absolutely impossible to admit that a common workman should have made a counterfeit as perfect as the one bought by the Museum of Saint-Germain ; the statuette is too like those discovered in deposits of the quaternary epoch to admit of its having had such an origin. If it is genuine, why should not the vendor have found it in the Barma-Grande which he partially excavated, as M. Rivière knows full well ?

M. G. de Mortillet uses other arguments to disprove the authenticity of the figure, He thinks that the statuette, made by a forger, has been carried for a long while in the pocket, in order to produce the patina on it, and to wear off the traces of its having been cut with a steel knife " (1). But the chief reason for his disputing its genuineness is that the breasts and posterior parts show an exaggerated development. Thus he would have us regard this figure as an indecent image fabricated by a dishonest person who, in order to attract the attention of amateurs and purchasers, has absurdly exaggerated these parts (2). On this supposition the statuettes found by M. Piette at Brassempouy would also be spurious, for they show such a development of the posterior

(1) Let us remark *en passant* that if these " traces of its having been cut with a steel knife " have disappeared there is nothing to prove that they ever existed.

(2) *Bull. de la Société d'Anthropologie de Paris*, 1898, p. 150.

parts that the archæological expert has compared them to Hottentot women.

M. Salomon Reinach has answered the objections of G. de Mortillet in a letter published in l'*Anthropologie* (1), and I think that for those who are impartial the question is settled. Therefore I do not hesitate to affirm that the men who inhabited the Baoussé-Roussé during the reindeer age had the same artistic instincts as their contemporaries in the south west of France.

III. — Upper Layers.

We know little about the stage of development of human handicraft during the formation of the upper layers in the Red Rock Caves. I have already mentioned the reasons. It will be sufficient for me to recall that the exploration of these layers was generally done with little care and that often the upper deposits had disappeared before those excavations, about which we have some information, were undertaken. I will add nothing to what I have said before (2). I showed, I think with sufficient clearness, that the caves contained on the surface a fairly thick neolithic layer, in which were found, among other things, polished stone axes. It would indeed be hard to see how this

(1) Cf. *L'Anthropologie*, t. IX, 1898, p. 613.
(2) See, Chap. I, p. 53.

could be otherwise, for one could not suppose that the formation of the deposit ceased suddenly at the end of the quaternary epoch; and if man continued to inhabit these caves he must necessarily have left in them some specimens of his handiwork.

CHAPTER IV

Physical characteristics of the men of the Baoussé-Roussé caves.

At the present time we possess a sufficient number of human remains found in the Baoussé-Roussé caves to enable us to form a fairly accurate idea of their racial type. What is most noticeable at first is the remarkable absence of variation in the tribe which inhabited this spot. The fundamental characteristics are the same in all the individuals, and what differences there are do not overstep the limit of individual variations which are to be met with in even the least mixed populations.

A. — *Stature.* — The race was certainly tall; although the height of our men has been greatly exaggerated. Inquisitive people have armed themselves with tapes and have measured the height of the skeletons from the top of the head to the extremity of the unguial phalanges of the feet, without troubling as to whether the bones were in their proper position or whether the feet were in an attitude of forced extention. The figure of 7 ft 6 in was thus obtained for the first skeleton found by M. Abbo.

A sculptor, M. Mégret, employed a method which is not new, and which has been discarded by all men of

science(1). To estimate the stature anthropologists now rely upon the relation which exists between the length of the long bones of the limbs and the total height of the body. M. Mégret bases his system upon the relation between the little phalange of the middle finger and the total height, of which this phalange should represent a sixty-fourth part. He arrives at results of surprising precision : — 6 ft 7 $^{3}/_{10}$ inches for the skeleton discovered in the Barma-Grande on the 12 th. Jan. 1894; 7 ft 1 $^{7}/_{10}$ inches for the one found in the same cave in 1892; 6 ft 7 $^{3}/_{10}$ in, 6 ft 4 $^{4}/_{5}$ in, 6 ft 9 $^{9}/_{10}$ in, for the three found by M. Rivière. Now nothing varies more in different individuals than the length of the fingers. And besides a mistake of one single millimètre in measuring the phalange will result in a total error of 64 millimètres. Hence it is impossible to place any reliance in M. Mégret's figures.

M. Rivière does not tell us what system he employed to estimate the height of his skeletons, or rather he forgets to mention the coefficients used by him. The figures he gives are as follows :

Man of the Cavillon cave..	6 ft 2 in, to 6 ft 4 in
First male skeleton of the sixth...	6 ft 8, to 6 ft 10
Second.....	6 ft 6, to 6 ft 8

These figures are certainly too high. For if we

(1) A. MÉGRET. *Etudes de mensurations sur l'homme préhistorique.* Nice, 1894.

re-estimate the height, with the aid of M. Manouvrier's coefficients, by taking the lengths of the long bones mentioned by M. Rivière in his book, we get the following results.

Skeleton of the fourth cave.

	LENGTH OF BONES		STATURE	
Humerus.....	13 3/5	inches	5 ft 8 2/5	inches
Ulna.....	11 3/10	—	5 ft 10	—
Radius.....	10 1/2	—	5 ft 10 2/5	—
Femur.....	18 1/2	—	5 ft 7 3/5	—
Tibia.....	16 2/5	—	5 ft 11 3/5	—
Average.....	....		5 ft 9 3/5	inches

(instead of 6 ft 2 in to 6 ft 4 in).

First Skeleton of the sixth cave.

Humerus.....	14 3/5	inches	6 ft 4/5	inches
Ulna.....	12	—	6 ft 2	—
Radius.....	11 1/5	—	6 ft 2	—
Femur.....	21 2/5	—	6 ft 3 3/5	—
Tibia.....	16 4/5	—	6 ft 1 1/5	—
Average.....			6 ft 2 in (instead of 6 ft. 8 in to 6 ft 10 in).	

Second Skeleton of the sixth cave.

Humerus.....	14 1/2	inches	6 ft 2	inches
Ulna.....	11 3/5	—	6 ft 4/5	—
Radius.....	10 1/2	—	5 ft 10 4/5	—
Femur.....	20 1/10	—	5 ft 11 2/5	—
Tibia.....	?			
Average.....			6 ft (instead of 6 ft 6 in to 6 ft 8 in).	

I have a serious objection to make with regard to the lengths given by M. Rivière. He does not hesitate to insert figures in his tables, even whilst admitting in the text that the bones with which he is dealing are incomplete. By accepting these hypothetical measurements we obtain, as I have just shown, statures considerably smaller than those which he mentions, and the difference varies between six and eight inches.

For the skeletons discovered by M. Abbo I have obtained the following results by using Manouvrier's data.

	LENGTH OF BONES		STATURE	
First man...	Femur... 22	inches	6 ft 5 3/5	inches
Second man.	Humerus. 13 4/5	—	5 ft 9 1/5	—
	Ulna..... 11 4/5	—	6 ft 2	—
	Radius... 10 7/10	—	5 ft 11 3/5	—
	Femur... 19 2/5	—	5 ft 10	—
	Average..		5 ft 11 1/5	—
Woman.....	Humerus. 13 1/10	inches	5 ft 8	inches
Youth	Humerus. 13 1/10	—	5 ft 5 7/10	—
	Femur... 17 3/5	—	5 ft 8 1/10	—
	Average..		5 ft 8	—

From my own observations I am inclined to think that M. Manouvrier's data give too low an estimate when dealing with very tall individuals. Nevertheless, even if we accept these results as accurate, these men of from 5 ft 9 in to 6 ft 5 in, this woman of 5 ft 8 in, who had not yet cut her

wisdom teeth, and this youth also 5 ft 8 in, may still be considered as tall. The average for the five men would be 6 ft 0 $^{4}/_{5}$ in.

B. — *Proportions.* — These individuals of such fine stature were at the same time very strongly built. It is naturally in the men that the signs of strength are especially noticed. All the bones show very powerful muscular insertions and are of considerable size : for instance, the lower end of the humerus of the first skeleton discovered by M. Abbo measures 2 $^{3}/_{5}$ in. in breadth, and the femur shows at the lower end a breadth of 3 $^{2}/_{5}$ in. It is especially on the femur that signs of unusual strength are seen. Every one knows that the posterior edge of this bone is very rugous and has been called the " linea aspera ". To this bone are attached the crural triceps, great gluteal, the three adductors, the crural biceps, the gemelli (" jumeau interne ") and the plantaris.

The more these muscles are developed the more prominent is this " linea aspera ". Thus in our men it forms a regular ridge, protruding as much as 2/5 of an inch in the charred skeleton.

The tibia shows a remarkable peculiarity which has been called *platycnemism*. The bone is very powerfully formed, but flattened transversely to such a degree that the posterior surface almost disappears. In order to estimate this characteristic, the relation between the transverse and antero-posterior diameters is ascertained, both measured

on the level of the foramen of the nutrient artery. The tibia of the carbonised skeleton gave me the lowest index ; it falls to 57. 14 ; this means that the breadth of the bone represents little more than half its thickness measured from front to back.

When I estimated the stature with the aid of the long bones I obtained a lower result when reckoning by the humerus than when I took the length of the ulna and radius as the base of my calculations. This indicates that the fore-arm is relatively more developed than the upper-arm. Moreover I have been able to make this fact clearer by calculating the ratio between the length of the radius and that of the humerus. My calculation in the case of the 1894 skeleton gave me the relation of 77.74 ; which figures come very near to those given by Broca and M. Hamy for negroes, who have abnormally long fore-arms. M. Rivière had worked out for the Cavillon cave skeleton index of 76.90 which is not so high but still very remarkable.

M. le professeur Testut has pointed out that on the Chancelade skeleton, which dates from the same period, the great toe was considerably separated from the other toes. Nothing of the kind exists in the Barma-Grande skeletons, at least in the two men whose feet were sufficiently well preserved to allow of my ascertaining the position of the phalanges. The big toe is parallel to the others and close to the second toe.

C. *Skull*. The head of the Baoussé-Roussé troglo-

dyte has well marked characteristics which are, as usual, more exaggerated in the men than in the woman. What strikes one at first is the disproportion between the cranium and the face ; the former being greatly developed in length (i. e. from

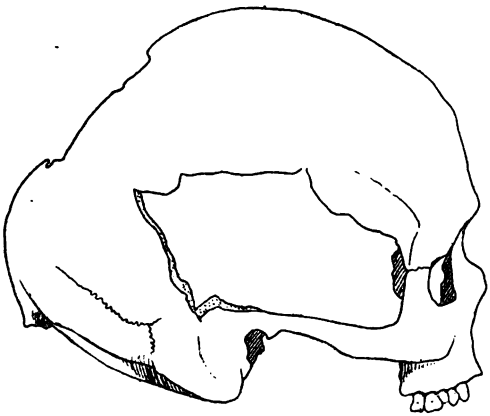


FIG. 35. — Skull of the male skeleton discovered in 1892 (1/3 natural size).

back to front) while the latter is very short and very broad.

Seen from above, the skull presents a fairly regular pentagonal shape, which is due to the remarkable development of the parietal bumps and the projection of the occipital bone. When seen in profile the forehead shows a fine curve continued regularly as far as the parietal region. At the back the parietal bones

are flattened, and the flat surface thus produced extends over part of the occiput; then this bone swells and forms a very decided bump. The base of the skull is unusually flat.

I have just said that the cranium is very long. In the first Barma-Grande skeleton the extreme length from back to front is 8 $^1/_2$ inches. This is quite exceptional. The breadth, obtained by doubling the dimension of that half of the skull which is in good preservation, is about 5 $^3/_{10}$ inches. Thus the cephalic index is little above 63. This indicates an extreme dolicocephalic type. It must be admitted that the bad condition of the skull does not allow of our giving the breadth measurement as exact, but even if we raised it a little it would still be extremely low. The pieces of the skull of the second male skeleton, discovered in 1894, had not been fitted together last March so I was unable to measure it. It has also been impossible to ascertain the cephalic index of the skulls found by M. Rivière in the other caves, on account of their bad condition; but it is certain that the man, whose skeleton is in the Paris Museum, was decidedly dolicocephalous. As to the one possessed by the Mentone Museum, its cephalic index is 73.9, which would still classify it as dolicocephalous. Moreover most of its characteristics point to its belonging to the same type as the others.

The great breadth of the face is due to the exaggerated development of the zygomatic arches in the middle and upper parts. The dental arch is on the

contrary narrow. The superciliary ridges are very prominent above the nose, but on each side they fall away to the level of the external orbitary apophysis of the frontal bone.

The eye orbits are rectangular, the corners being

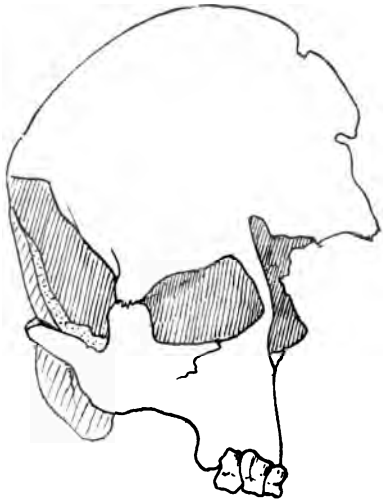


FIG. 33. — Skull of the male skeleton discovered in 1892 (1/3 natural size).

barely rounded (fig. 36). Another peculiarity is the lowness of these orbits compared to their width. The orbitary index falls to 60, which means that the height represents only 60 per cent of the width. The nose is somewhat narrow and projecting, and the

upper jaw-bone is rather prognathous in the lower, or dental, region.

The lower jaw is powerfully formed, and its rising branches are unusually broad. The triangular shape of the chin and worn condition of the teeth are noticeable even in the skeleton of the youth found by M. Abbo. In the adults the crowns of the teeth are worn all over, as can be seen in the male skeleton found in 1892.

The remains of the youth and the woman show the same general characteristics as the men, with the attenuation resulting from age or sex. Thus the skull of the woman, although obviously dolicocephalous (cephalic index 71.58) shows neither the parieto-occipital flat surface, nor the flattening of the base of the skull, which I drew attention to in the men. The face is low and broad; the eye orbits have the angles rather more rounded but they are still extremely wide in proportion to their height (index 73-81).

To sum up, the race represented at Baoussé-Roussé is remarkable for its tall stature; its exceptional muscular development; the length of the fore-arm; the prominence of the " linea aspera " of the femur, which, in the men, amounted to a regular ridge; and the transverse flattening of the tibia.

The head, of great capacity, is abnormal in so far as it presents a cranium which is very elongated coupled with a face which is short and broad.

The projection of the parietal bumps gives a

pentagonal shape to the vault. The forehead is

FIG. 37. — Skull of the female skeleton (1/2 nat. size).

wel developed, with a regular curve. At the back of the skull there is a flat surface on the posterior

parietal region and on the upper part of the occipital region. The occipital bone then swells to flatten again at the base of the skull. The face is broad in the upper and middle parts, but narrow in the jaws. The eyes were sunk in rectangular orbits which are disproportionately wide and low. The superciliary ridges above these orbits are very prominent near the nose but fall away and disappear at the sides. The nose is narrow like the jaws. The lower jaw, with its prominent, triangular chin, is very powerful, and bears, as does the upper jaw, teeth which showed signs of premature wear.

Such are the principal characteristics of this curious race, which differs considerably from the present inhabitants of this land, and, I may add, from nearly all modern types. Still in the past this race numbered many representatives. For in the reindeer age it peopled the south-west of France, where it left numerous traces of its occupation. It is known to science as the *Cro-Magnon race*, because this type was discovered for the first time in a rock shelter of this name at Eyzies in the Vésère Valley. Some scientists have proposed to change the name to that of the Baumes Chaudes, another locality where the type of this race has been found in all its purity. I shall keep the name of Cro-Magnon because it has the right of priority and is moreover better known than the other. It is indeed to this race that the men of Baoussé-Roussé belonged, for they reproduce all its essential

characteristics. I would go so far as to maintain that their identity with this race is borne out even by the details of structure; and I could prove this were I to enter upon technical considerations, but I have refrained from doing so for fear of wearying the reader.

As the Cro-Magnon race flourished during the reindeer age, it ought to have been still occupying the south-west of this country during the transition between the quaternary and the present epochs, for its persistence into the neolithic period has been established. It is to the people of this race that the workmanship of the implements, found in the layer immediately above that of the elephant, has been attributed. The numerous drawings and carvings of the end of the quaternary epoch are also considered to have been executed by these men. That this race lived at Baoussé-Roussé is certain from the evidence of the skeletons which present all its physical characteristics; from innumerable implements bearing, so to speak, their trade mark; and from their artistic productions. It would seem that there remains nothing more for me to do now but to bring this little sketch to a close. Nevertheless I must devote another chapter to the question of the date of the interments.

CHAPTER V

Date of the Interments.

When it was said that the whole deposit which filled the Baoussé Roussé Caves belonged, from the surface down to the bottom, to the same epoch, the quaternary, the surface layers were not taken into consideration ; moreover an uncertainty remained which it will be as well to clear up.

The quaternary epoch was indeed long, though it cannot be compared as regards duration to those which preceded it. Nevertheless it was long enough for scientists to see fit to subdivide it. These subdivisions were necessary, for between the beginning and end of this epoch the species of animals were considerably modified and human workmanship underwent remarkable improvement. I have mentioned in the beginning of this sketch that Lartet, from a palæontological point of view, proposed four subdivisions which, classifying according to age, he called :

1. Period of the Cave Bear.
2. Period of the Mammoth and tichorhine Rhinoceros.
3. Period of the Reindeer.
4. Period of the Aurochs.

G. de Mortillet in his turn gives us a classification based principally upon the workmanship of the implements found. This also contains four subdivisions, which, beginning with the most ancient, are

1. The Chelles Period.
2. The Moustier »
3. The Solutré »
4. The Madeleine »

He has endeavoured to make these subdivisions agree, not only with the types of implements, but with the fauna and also with the geological phenomena.

Can we assign our interments to any one of these periods ? At the outset there would seem to be no doubt, as the first skeletons of the Barma-Grande were found just above the elephant layer ; they are therefore more recent than the formation of this deposit. They lay in the stratum containing the reindeer's jaw-bone, and on the same level as implements typical of the Madeleine period. Consequently it seems natural to conclude that they are contemporary with the reindeer, or else that they date from the so-called Madeleine period of de Mortillet — a period which exactly corresponds with the time when the *Cervus tarandus* was most abundant in this country. Nevertheless I have had grave doubts about this, and after having studied the question on the spot, I published my opinion, in 1892, that the date of burial was not so remote as the quaternary epoch.

These are the principal arguments in support of my view (1).

The skeletons lay right in the midde of the reindeer stratum, but the bodies had been buried in a trench, the posterior wall of which I saw distinctly. This trench must have been dug in the earth of a previously deposited layer. The funeral accessories were of a more recent appearance than the implements and ornaments found in that portion of the layer which had not been disturbed, and even than those of higher levels. The big flint blades placed in the grave beside the bodies, and the bone bodkin found on the forehead of the Paris Museum skeleton, are of a neolithic character. The dainty little bone hanging ornaments show a refinement of taste not possessed by the workmen who made the clumsy pendants found at a higher level. (See figs 27 to 33).

On the other hand the absence of all pottery or polished stone implements does not permit of these interments being assigned to the neolithic age proper.

For this reason I came to the conclusion that they date from the beginning of the present geological epoch, from that period which forms the transition stage between the paleolithic and neolithic ages. At

(1) Cf. R. VERNEAU. Nouvelle découverte de cadavres phéhistoriques aux Baoussé-Roussé, près de Menton (*L'Anthropologie*, t. III, 1892).

this time the Cro-Magnon race peopled our country. My hypothesis therefore seemed to me to explain all the facts.

My paper raised sharp controversy. Violently assailed by a scientist who had never visited the scene of the excavations, but to whose knowledge and experience I willingly bow (1), I replied with the ardour inspired by firm conviction. The discussion soon ceased to be scientific, and I thought it as well to close it with the following sentence : " New facts are needed to carry on this discussion, for without them we can only continue to make futile repetitions (2).

Since then I have written nothing more about Baoussé-Roussé, except a few notes which appeared in the " *Bulletins de la Société d'Anthropologie de Paris* ", on the occasion of a present I made to this Society in May 1898.

M. Rivière, who had not seen the objects figured in my first pamphlet, did not hesitate to pronounce them as false I disposed of this charge, but I was none the less anxious to show the specimens themselves to various archæologists. All of my colleagues

(1) E. D'ACY. " De l'âge des sépultures des grottes des Baoussé Roussé. " Bruxelles. This paper was read on Sept. 7, 1894 before the " Congrès scientifique international des catholiques ". It appeared in October of the same year in the *Revue des questions scientifiques*.

(2) This whole controversy is in vol. VI of *L'Anthropologie*, 1895, p. 153-159, 344-345, 488, 489.

were unanimous in considering them as undoubtedly genuine.

The differences of opinion as to the date of these interments made me all the more anxious to examine on the spot the objects discovered by M. Abbo since 1892. Last March (1899) therefore I returned to the Red Rocks, in company with my friend and colleague M. Boule, whose competence in prehistoric archæology is recognised by all who are interested in these subjects. I had to slightly modify my first opinion, and I lost no time in publishing another article in our " *Revue* " (1).

Before explaining my present standpoint I must recal certain facts.

The reader will remember that the skeletons found in 1894 lay at a depth of 5 ft 4 in above those discovered by M. Abbo in 1892. I do not know whether they had been buried in a trench, for no observations were made with regard to this. In any case the charred skeleton can have been laid in only a very shallow grave. The position of the bones which were, as I have said before, in their correct anatomical position, would imply that the body was burnt on the spot. It is evident that if it had been burnt elsewhere, and the remains afterwards transported to the grave, the bones would have been mixed up: we should not

(1) R. VERNEAU. Les nouvelles trouvailles de M. Abbo dans la Barma-Grande, près de Menton *(L'Anthropologie*, t, X, 1899, n° 4).

have found, for instance, the legs placed symmetrically under the thighs, and the feet at the end of the leg bones under the ischium with all their bones in the normal position.

But the cremation can only have taken place on the surface of the ground, or in a very shallow trough, for in a deep one the heat would not have been great enough to destroy the soft parts and char the bones. It follows that when the body was burnt the cave was already filled up to the level at which M. Abbo found this, the last, skeleton; and that the formation of this layer must have ceased at about this level.

Although the 1892 skeletons were found at a lower level it would seem that they are contemporary with the charred remains. I have shown in the preceding chapter that all the skeletons present the same physical characteristics and that they consequently belong to the same ethnical type. Also in chap. III, we have seen that the funeral accessories and the ornaments were the same in the case of all the skeletons, whether found at a low or high level. If it be admitted that the interments were contemporary, it follows that the three individuals, whose remains were brought to light in 1892, must have died when the deposit of the reindeer age had attained a thickness of about of 8 in, for it extended below the graves (1).

(1) I have mentioned the slight inclination, towards the

But at this time deer were abundant. Indeed the frequency with which deer and present day animals are found on the same level as the last skeletons makes us wonder whether the quaternary epoch had not terminated at the time when this stratum was being formed. It is probable, or even certain, that this was not so. For among the deer bones were found, alongside the *Cervus elaphus*, those of a big stag resembling in size the Canadian stag, and which completely disappeared from this country a little later. Moreover the human handiwork of this level is of the Madeleine type. These two facts would indicate that we are still in the quaternary epoch but near its close.

Under this supposition all the facts are easily explained. In order to lay the first bodies (those discovered in 1892) at the depth at which they were found, it was necessary to dig only the moderately deep trench, the posterior wall of which was still visible at the time of their exhumation; and there is nothing surprising in this, for it was not a pit of at least eight yards (1) that they had to dig, but a common grave barely the height of a man. The

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mouth of the cave, of the layers which form the deposit. But this is not sufficient to allow us to consider the skeletons of the first grave as being on the same level as those of the bottom of the cave.

(1) It will be remembered that these bodies were found eight yards below the surface of the cave earth. Translator.

difference between the flint implements found in the grave itself and those met with at the same level, but outside the trench, is as easily explained. The former are blades measuring sometimes as much as 10 $^{2}/_{5}$ inches in length and two inches in breadth : the latter are, on the contrary, remarkable for their small dimensions. We can also understand the presence, in the lower grave, of those dainty little bone pendants, so finely wrought, and which it is impossible to consider as the work of the immediate successors of the men who made the clumsy implements of the elephant layer.

On the whole I remain convinced that the skeletons found in the lower grave are not exactly contemporary with the formation of the layer in which they were discovered. Nevertheless it cannot be denied that neither the flint blades nor the ornamental objects are exactly neolithic in type. I was able, on the occasion of my last visit to the Baoussé-Roussé Caves, to examine the double olive-shaped ornaments which had been discovered since my first visit. I also re-examined the pendants which I had figured in *L'Anthropologie*, and I ended by being persuaded, as did also M. Boule, that they show a great similarity to certain objects of the reindeer age. But, for the reasons which I have brought forward in this chapter, I am of opinion that the skeletons discovered by M. Abbo must have been buried in the Barma-Grande at the end of this period. We must there-

fore carry back further into the past than I had at first done, the date of burial of the Baoussé-Roussé men ; and, instead of attributing them to *the dawn of the present epoch*, we must assign them to the *close of the reindeer age*, — that is the period immediately preceding our own and which is separated from it by a transitional time, the duration of which it is difficult to estimate. In any case nothing authorises us to consider, as M. Rivière does, that the human remains found in the Red Rock Caves are contemporary with the elephant and tichorhine rhinoceros, or the big felines and cave bears. For, wherever the soil has not been disturbed, we find the remains of these animals at a much lower level than the human remains. And they are associated with specimens of human handiwork very different from that of the graves, and even from that of the deposit in which the bodies lay.

CHAPTER VI

Recapitulation and Conclusion.

Let us sum up in a few pages the conclusions to be drawn from the facts stated in the preceding chapters.

As far as we can judge from the rather vague information given by several authors, the Barma-Grande presented the same conditions as the other Baoussé-Roussé Caves. Formed in a rocky mass which had been deposited under the sea, as is proved by the numerous marine shells embedded in the limestone forming the cave walls, the cavern was quite empty at the time when the mass emerged from the waters, probably towards the end of the tertiary epoch.

When once the caves were above the level of the sea they began to be filled up by matter brought from outside. The great mammals, which are now extinct, flourished at this time; and we find their remains in the deposits then in course of formation.

We cannot say what animals may have left their remains in the lowest deposit, for the excavations have not yet reached the bottom of the cave : but we may state that an elephant and a rhinoceros lived at the time of the for-

mation of the lowest stratum as yet explored by M. Abbo. Their remains have been found, and it must be conceded that they have lain there since the deposit was formed, for among the bones collected was the iliac bone of an elephant with the femur still attached to it.

From this time onwards man inhabited the Red Rock Caves. He sheltered in them and lived by hunting.

These troglodytes fashioned rough stone implements of which we find specimens in their abode. They employed for this purpose the materials nearest at hand ; gritstone and limestone were used on a large scale. Of these they made scrapers, blades, lanceheads, etc. These implements and weapons are worked on one side only, like those characteristic of the so-called Moustier type. The other side has been split off from the block, or core, and is smooth. Another thing characteristic of these implements is that they show none of the fine chipping or retouching seen on the more recent handiwork. It is true that neither gritstone nor limestone is adapted to fine workmanship. But in the same elephant layer flint implements were found : they are, like the former ones, worked on one side only. The clumsy way in which these are wrought shows but primitive skill on the part of the workmen who made them.

The formation of the deposit continued after

the elephant ceased to wander on the shores of the Mediterranean. The disappearance of this proboscidian, and also of the rhinoceros, is proved by the absence of their bones in the next layer. A new animal, the reindeer, makes its appearance. No remains of *Cervus tarandus* had been found in the other caves, and it had even been stated that it had never existed on the Mediterranean watershed of the Alps. But in M. Abbo's collection of bones from the Barma-Grande M. Marcellin Boule discovered the fragment of a lower jaw-bone of this animal. More remains of Cervus tarandus will probably be found amongst the bones from the reindeer layer, for these have never been sufficiently carefully examined.

The mere presence of this jaw-bone proves that the reindeer lived in this land, for it is not likely that the hunters made very long journeys in search of their game. In any case the scarcity of its remains must lead us to suppose that it was not abundant.

The Urus, or Wild Bull *(Bos primigenius)*, another Ox, probably *Bison europæus;* a Goat, differing little from our present animal ; the Roebuck *(Cervus capreolus)* ; the Ibex *(Capra ibex)* ; the Wild Boar *(Sus scrofa)* ; the horse *(Equus caballus)* and the Fox *(Canis vulpes)*, are all more or less frequently met with in the deposit we are dealing with. The Red Deer *(Cervus elaphus)* abounds a

little higher up, and is associated with another large stag similar in size to the Canadian stag.

Man continued to inhabit the Red Rock Caves during the formation of the deposit in which the remains of all the above-mentioned mammals were found. Traces of him are very numerous in this layer : they include stone weapons and tools, bone implements, and ornaments. Occasionally we come across the hearths on which he lit his fires ; these are recognisable by a mass of ashes, charcoal and often bones more or less charred. For the bones of animals did not get into the cave by accident ; they were brought there by the hunters who pursued their big game in the neighbourhood, and returned laden with the quarters of animals which they had succeeded in bringing down. The flesh was doubtless consumed cooked, which accounts for the charred appearance of some of the bones : other bones were split in a systematic way so as to extract their marrow.

In order to slay his game man fashioned stone, and sometimes bone, lanceheads. The material used to make these implements was nearly always flint. Experience had taught him that flint was far superior to gritstone and limestone for his purpose and he had abandoned the latter. Besides this the hunter of the reindeer age had acquired in this work a skill unknown to his ancestors of the elephant period. When he had rough-hewn an implement and was not satisfied with it, he would rechip it, and

improve it by removing a number of small flakes from one, or both, of its surfaces. This finer workmanship is what characterises the stone implements of this second period : in the Baoussé-Roussé they are also all of small dimensions. Some tools were not worked at all. The edge of a flint flake, for instance, would have been destroyed if any attempt had been made to chip or retouch it.

Among the stone implements found in the layer above that of the elephant I will mention, besides these flakes or blades, scrapers single and double, scraper-gravers, gravers, borers and lanceheads. All these belong to the so called Madeleine type. The presence of the gravers among the flint instruments, denotes that these men also worked in bone at this period I have already mentioned the bone lanceheads of that time : I might add bodkins and polishers, not to mention several tools (enumerated elsewhere) found in the other caves.

But bone was used not only for weapons and implements ; it was frequently employed in the manufacture of all sorts of hanging ornaments. Canine deer teeth, vertebræ of fish, and sea shells with a hole pierced to thread them by, also formed a large proportion of the ornaments with which these troglodytes of the reindeer age bedizened themselves.

These people carried their love of ornament to considerable length. That they really had a certain artistic faculty is shown by the drawings and sculptures made by them. It must be admitted however

that these are few in number. A steatite statuette and two engraved objects — one in schiste and the other in steatite — were found in the Barma-Grande in 1884 by M. Julien, who sold them twelve years later to the Museum of Saint-Germain-en-Laye. The figure, which is only 1 $^{4}/_{5}$ inches (47 millimètres) high, represents a naked woman with enormous breasts and posterior parts. It bears a striking resemblance to the ivory statuettes found by M. Piette at Brassempouy in the deposits of the end of the quaternary epoch. The other engraved objects are simply decorated with geometrical patterns.

We do not know what the depth of the reindeer layer was. The superficial deposits of the Barma-Grande were not examined in a systematic way ; and it was only after the discovery of the skeletons, which I shall speak of presently, that scientific excavations were carried on in the soil which had not been removed. Neolithic implements would probably have been discovered in the surface layer had this been carefully searched, for finds of this sort had been made in the other caves, as I have mentioned before. I have been told of a polished stone hatchet which is said to have been found near the surface in the Barma-Grande, but not having seen it, and having no accurate information about the exact depth at which it lay, I shall not notice it further.

It seems undeniable that the cave earth has been disturbed at certain levels. And this explains the presence at a considerable height of implements

strangely resembling those of the lowest layer. Pieces of breccia, found at a level of four, five and even six yards above the elephant layer, and containing clumsily made implements in gritstone, appear to have been detached from the lower stratum. These pieces, none of them larger than a man's head, were found in the middle of a totally different deposit. The earth in the cavern sloped towards the entrance and formed a kind of talus, so that the lower layers projected beyond the upper ones and were thus easily accessible at their edges. Hence it is not surprising that implements, made long before, should have been picked out of the lower stratum by later occupants and carried back into the cave.

Are there any human remains in the elephant layer? This question is still unsolved, as that layer has as yet been only partially explored. We might however expect to find the remains of man himself at any time, since the weapons and implements found indicate that he inhabited the Barma Grande at this period. In the cave-earth of the reindeer age the skeletons had been buried. M. Julien disinterred the first in 1884. In 1892 M. Abbo discovered three more, and in 1894 he brought to light two others, one of which was completely charred. Thus it would appear that these caves served not only as dwellings but also as burial places.

We have little information about M. Julien's discoveries; but we possess circumstantial details as

to the conditions under which the other skeletons were discovered seven years ago. The three found in 1892 had been buried in a pit, the posterior wall of which was still distinctly visible. They lay at a depth of twelve feet above the place where the elephant's pelvis was dug up. The last two were 5ft 4 inches above the first, and while the latter lay at but about a yard from the original entrance of the cave, the former were nearer to the far end.

It would seem that the position of the bodies was dictated by no funeral rites, for they lay, some on their backs and others on their sides, and parallel with either the longer or the shorter axis of the cave. A layer of ferruginous earth, brought from the neighbouring mountains, had been strewn at the bottom of the first trench. On this the three bodies a man, a woman and a youth — had been laid, and then covered with the same earth. When decomposition had done its work, the peroxide of iron, coming into direct contact with the bones, coloured them, as it did the various ornaments which had been buried with the dead. We gather, from the observations made by M. Rivière in the other caves, that this custom prevailed in the case of adults, but the young children were not interred in a bed of colouring earth.

Funeral accessories were found in all the graves. Men and women, as well as the youth, had big flint blades buried with them. Some of these were as much as 10 ¾ inches long and very different in

this respect from the small flint implements found close by, on the same level. In some cases the blade was under the head, in others on a level with the left hand. M. Julien mentions an instance in which the body had a big blade on each shoulder. The fourth skeleton found by M. Abbo had, instead of a flint blade, a piece of gypsum near the left hand. This hand had been brought up to near the level of the chin, a fact which has been noticed several times.

Besides the implements which we have just been considering, each body had its ornaments with it. The little perforated marine shells, of the genus *nassa*, found near the head, seem to indicate that these individuals wore a kind of fillet, in the meshes of which the shells were strung. Canine deer teeth, perforated and often decorated with lines cut in them (figs 6 and 7), and dainty bone pendants, skilfully carved and tastefully ornamented, served to complete the effect of this headgear.

Necklaces made of shells, vertebrae of fish, or canine deer teeth, were found round the necks of some of the skeletons. These were sometimes used all together and symmetrically arranged (fig. 10). One particular kind of pendant, cut out of bone in the shape of a double olive and decorated with rows of little parallel scratches, was picked up either on a level with the chest or near the hand.

Lastly we have the perforated shells, of the genus *cypraea*, lying on each side of the knees o one of the adult male skeletons. These had probab

ly been strung together and worn as a kind of anklet or garter.

We might mention also bracelets and loin cloths made of shells (*nassa neritea*), but these were found in the other caves and not in the Barma-Grande.

Hitherto only one case of cremation has been met with. The burnt skeleton had its legs doubled up under the thighs with the feet close to the haunch. It lay at the back of the cave on the same level as, and behind the fourth skeleton discovered by M. Abbo.

All the individuals whose remains were unearthed, whether in the Barma-Grande or in the other caves, belong to one and the same race. The differences observable are either individual variations or else due to age or sex.

The people who lived at Baoussé-Roussé were tall ; some of the men were close upon 6 feet 8 inches in height. They were as remarkable for their strength as for their stature. The muscles for instance, which are inserted on the posterior edge of the femur, were so strongly developed that the *linea aspera* forms a regular ridge at the back of the bone. The tibia shows that curious transverse flattening which has been called *platycnemism*. It is nevertheless as powerful as the rest of the skeleton.

The head also shows very marked characteristics. Generally when in a race the antero-posterior axis of the cranium is elongated, the face is also long. But this is not so in the Baoussé-Roussé troglodytes. The head is singularly lacking in symmetrical proportions.

For while the cranium is very long in proportion to its breadth, the face on the contrary is very broad and short. Seen from above, the head, instead of appearing elliptical, has a more or less pentagonal outline owing to the prominence of the parietal bones. Looking at it in profile we notice the following peculiarities : the forehead is well curved and regular, so also is the anterior parietal region. Behind, the parietal bones are flattened and the flat surface thus produced extends also over the upper part of the occipital region. Below this again the occipital bone projects suddenly and then falls away at the base.

I have drawn attention to the broadness of the face. But it must be borne in mind that this exaggerated development extends only over the upper and middle portions of the face, for the jaws are considerably narrower. The superciliary ridges, which are very prominent near the nose, fall away and disappear completely outside. The eye orbits are very wide and very low : they assume a rectangular shape, for the corners are barely rounded. The nose is prominent and rather narrow. The upper jaw is slightly prognathous. In spite of their comparative narrowness the jaws are nevertheless remarkably powerful. We may notice lastly the triangular, projecting chin and the worn condition of the teeth.

All the characteristics of which I have just given a brief outline are those of the Cro-Magnon race which peopled the South-West of France during the reindeer age. They were a race of troglodytes — that is cave dwellers — who had the same customs as the

men of the Baoussé-Roussé and made implements of the same type. This is unquestionably the race to which we must refer the inhabitants of the caves of the Red Rocks.

Nevertheless it is still an open question whether the men, whose remains were discovered in the Barma-Grande and in the neighbouring caves, really lived during the quaternary epoch. We know that there were still many representatives of the Cro-Magnon race in our country at the beginning of the polished stone age. We may therefore infer that they also lived in the neighbourhood of Mentone. The discovery in the Barma-Grande of the trench to which I have drawn particular attention was one of the chief reasons for my raising this question; for we can easily understand that the men should have dug a grave in the quaternary deposit in order to bury their dead, without having lived at the time when the deposit was in course of formation. The absence near the skeletons of animal remains characteristic of the quaternary epoch; the presence in the graves of those big flint blades, so different from the small implements met with at the same level everywhere else in the cave, and the dainty workmanship of certain ornaments, led me at first to the conclusion that our Cro-Magnons of the Baoussé-Roussé had been buried in the caves at the commencement of the present geological epoch, when man had not yet learnt to polish his implements or to make pottery. But subsequent investigations which I was able to make this year (1899) induced me to slightly modify my first opinion.

The last skeletons discovered by M. Abbo (1894) should be considered as contemporary with those which he unearthed in 1892, for the physical characteristics and the funeral accessories were in both cases identical. The later ones however lay 5 feet 4 inches above the others and this difference of level cannot be accounted for by the slope of the layers alone. But these last bodies must have been laid on the surface or in a very shallow grave, though we have no positive information to this effect. My reason for thinking thus is the presence of the charred skeleton which could not have been cremated in a deep trench, for the heat would not have been great enough to burn the flesh and char the bones. We must therefore suppose that the last discovered bodies were laid on the spot where their remains were found at the time when the deposit had reached that level. To explain how the remains of their contemporaries come to be found at a lower level, we have only to suppose that graves had been dug for them. This theory is all the more probable since I have myself, in the presence of witnesses, confirmed the existence of this grave.

But the quaternary epoch was drawing to its close at the time when the deposit had reached the level at which the charred skeleton was found. The animal remains of this level are no longer truly characteristic of the quaternary epoch. There are still, it is true, remains of a large stag resembling in its size the Canadian stag which has

now completely disappeared from this country, and perhaps also a few bones of the *Bos primigenius*, but this is all. Nevertheless some bone pendants which I re-examined, and others, which had been discovered after my first visit to the caves, seemed to me to bear a great likeness to certain ornaments of the quaternary epoch. For these reasons I thought it better to carry back the date of the interments to the close of the quaternary epoch. This change of opinion does not in fact amount to much, for when the quaternary epoch ended our present epoch began at once. There was no sudden break. The discoveries of M. Piette have contributed much to the filling up of that gap supposed to exist between the two epochs, and have gone far towards proving that the transition from the palæolithic to the neolithic age took place gradually and imperceptibly. Taking this into consideration therefore it is not to be wondered at if we experience difficulty in attributing with certainty an implement to a given age.

This is the case with the Baoussé-Roussé finds. Nevertheless M. Abbo's discoveries have brought us a step forward by showing that it is impossible to maintain the theory that the troglodytes of the Red Rocks were contemporaneous with the elephant and rhinoceros. The remains of these animals lie at the bottom of the deposit, those of man are met with at a much higher level.

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